DOCUMENT RESUME

ED 287 439 HE 020 913

AUTHOR	Stark, Joan S.; And Others
TITLE	Designing the Learning Plan: A Review of Research and Theory Related to College Curricula.
INSTITUTION	National Center for Research to Improve Postsecondary Teaching and Learning, Ann Arbor, MI.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	86
GRANT	OERI-86-0010
NOTE	99p.; From the NCRIPTAL Program on Curricular Integration and Student Goals.
AVAILABLE FROM	NCRIPTAL, Suite 2400 School of Education Building, The University of Michigan, Ann Arbor, MI 48109-2748 (Technical Report No. 86-C-001.0, $10.00).
PUB TYPE	Information Analyses (070)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	*College Curriculum; College Instruction; *Curriculum Development; Definitions; *Educational Research; Higher Education; Instructional Improvement; Planning; Research Design; *Research Needs; Secondary School Curriculum
IDENTIFIERS	Alverno College WI; College Outcomes Assessment

ABSTRACT

A summary of major writings on college and pre-college curriculum literature are presented in this report, which is an early step in establishing a framework for the research program of the NCRIPTAL (National Center for Research in Postsecondary Teaching and Learning) Program on Curricular Integration and Student Goals. Section 1 on the literature of college curricula includes: historical and background reports (e.g., Carnegie Council on Policy studies); prescriptive views of quality, related to recommendations of national reports; strategy views, related to the educational process (e.g., national report recommendations, disciplinary approach, and discussions of student development); studies of curricular change (e.g., those at Alverno College, and liberal arts outcomes research). Definitions of curriculum are offered in the second section, which focuses on pre-college literature, as well as discussions in the literature of: the nature of curriculum development or planning; theoretical assumptions and approaches to curriculum planning and curriculum; cognitive psychology and curriculum development; and the teacher as curriculum planner. The final section proposes six assumptions for use in models of curriculum research, identifying such variables as student involvement, the organization of a discipline, and student outcomes. Fourteen pages of references are included. (LB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

NATIONAL CENTER FOR
RESEARCH TO IMPROVE
POSTSECONDARY
TEACHING and LEARNING

ED287439

913

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

NCRIPTAL

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Designing the Learning Plan

A Review of Research and Theory Related to College Curricula

Papers in this series available from NCRIPTAL

Approaches to Research on the Improvement of Postsecondary Teaching and Learning: A Working Paper
Patricia J. Green and Joan S. Stark

Focusing on Student Academic Outcomes: A Working Paper
Joanne M. Alexander and Joan S. Stark

Postsecondary Teaching and Learning Issues in Search of Researchers: A Working Paper
Carol D. Vogel and Joan S. Stark

Teaching and Learning in the College Classroom: A Review of the Research Literature
Wilbert J. McKeachie, Paul R. Pintrich, Yi-Guang Lin, and David A. F. Smith

Psychological Models of the Impact of College on Students
Harold A. Korn

Faculty as a Key Resource: A Review of the Research Literature
Robert T. Blackburn, Janet H. Lawrence, Steven Ross, Virginia Polk Okoloko, Jeffery P. Bieber, Rosalie Meiland, and Terry Street

The Organizational Context for Teaching and Learning: A Review of the Research Literature
Marvin W. Peterson, Kim S. Cameron, Lisa A. Mets, Philip Jones, and Deborah Ettington

Electronic Information: Literacy Skills for a Computer Age
Jerome Johnston

Design in Context: A Conceptual Framework for the Study of Computer Software in Higher Education
Robert Kozma and Robert Bangert-Drowns

Designing the Learning Plan

A Review of Research and Theory Related to College Curricula

by
Joan S. Stark
and
Malcolm A. Lowther
with assistance from
Sally Smith

Grant Number OERI-86-0010

Joan S. Stark, Director
Wilbert J. McKeachie, Associate Director

Suite 2400 School of Education Building
The University of Michigan
Ann Arbor, Michigan 48109-1259

(313) 936-2748

Acknowledgments:

The authors thank Clifford Adelman, Jack Rossmann, and Patrick Terenzini for their helpful comments on an earlier draft of this paper.

Excerpts of works cited here are reproduced to make you aware of their availability. We encourage you to refer to the works in their entirety and have fully cited works referred to in this report. Because some works were still in draft form at the time of this review, we have cited the draft, which may have been altered in subsequent publication.

@ 1986 by the Regents of The University of Michigan

The project presented, or reported herein, was performed pursuant to a grant from the Office of Educational Research and Improvement/Department of Education (OERI/ED). However, the opinions expressed herein do not necessarily reflect the position or policy of the OERI/ED and no official endorsement by the OERI/ED should be inferred.

Contents

Introduction 1

Context for the Report 1
The Current State of Knowledge about College Curricula 4
Boundaries of the College Curriculum Literature 6

I. A Summary of Major Writings on College Curricula 11

A. Recent Reviews of Curriculum Literature 11
B. Historical and Background Reports 12
  Work of the Carnegie Council on Policy Studies 12
  An International Perspective 15
  The Current American Scene 16
C. Prescriptive Views—The Quality Educational Product 17
  Recommendations of the National Reports on Particular Educational Products 18
  A "Liberating" Perspective 19
  A Research Synthesis on Academic Outcomes 20
D. Strategy Views—A Focus on the Educational Process 21
  Introduction 21
  The Educational Process Recommendations from the National Reports 21
  A Disciplinary Approach 23
  The Curricular Notions of Halliburton 27
  A Curricular Classification by Bergquist 28
  The Case for Curricular Design 30
  Instructional Development Strategies 31
  Other Important Contributions 31
  Student Achievement and Student Effort 31
  Student Development Approaches (Cross) 33
  Student Development Approaches (Chickering) 34
  Student Development Approaches (Perry) 35
E. Studies of Curricular Change 37
  The Alverno College Studies 38
  Winter, McClelland, and Stewart's Research on Liberal Arts Outcomes 40
  The Immediate Future 40
F. Summary 42

II. Summary of Pre-College Curriculum Literature 45

A. Definitions of Curriculum 45
B. Nature of Curriculum Development or Planning 46
  Discourse on the Nature of the Curriculum 46
  Literature on Curriculum Research 46
  Literature on Curriculum Development 47
C. Theoretical Assumptions for Curriculum Planning 47
D. Approaches to Curriculum Development 49
  The Balance of Participation 49
  A Knowledge Structure Base 52
  The Dilemmas of Curricular Change 53

7

E. Frameworks for Building Curricula 54
F. Cognitive Psychology and Curriculum Development 56
G. The Teacher as Curriculum Planner 59
H. Summary 63

III. Models for College Curricular Planning and Research 67

A. Definitions 72
B. Tentative Definitions 74
C. Conclusion 75

References 77

Figures

1. The Permeable Boundaries of Literature Bearing on the College Curriculum 7

2. Path for a Student Development and College Impress Model (C. Robert Pace) 32

3. Matrix for Identifying Curriculum Development Strategies (Short) 51

4. Relationship Between the Model of Course Planning and Components of *Course Design* (Posner & Rudnitsky, 1982) 60

5. A Model of Teacher Thought and Action (Clark & Peterson, 1986) 62

6. Tentative Curriculum Design Model 71

Introduction

The primary tasks of NCRIPTAL's Research Program on Curricular Integration and Student Purposes are to establish a framework for systematic research concerning college curricula, to field test the framework, and to design and commence collaborative studies that may assist colleges in determining the potential effect of various curricular strategies on learning outcomes for students of different backgrounds and goals.

This technical report is an early step in establishing a framework for the research program. As such, it examines a wide variety of alternative ways in which discourse concerning college curricula could be solidly based on documented evidence and selects the most promising of these for further development. Thus, the technical report has three specific purposes and, correspondingly, after an initial introduction and context statement, the report is organized in three sections:

Section I summarizes recent literature about college curricula, noting the particular foci, strengths and deficiencies of existing persuasive arguments, frameworks and research models. In order to focus the review, a scheme to establish boundaries of the relevant literature is first presented. Subsequent sections cover (1) general reviews of the curriculum literature in higher education, (2) background works (historical treatments, descriptions of current practice), (3) literature concerned with the educational product, including (a) exhortative writings or frameworks describing views of good quality education or what college students should learn and (b) empirical studies concerned with educational outcomes, (4) literature concerned with the educational process, particularly curricular planning or design, and (5) discussions and research on curricular change. The section concludes with our prediction that the balance of literature concerning the curriculum is likely to shift in the near future from persuasive writing to data-based studies.

Section II examines the work of curriculum specialists at pre-college educational levels to identify theories that may be developed or modified for use in postsecondary education. The literature review is selective and deals with three primary areas: (1) curriculum theory with its several subdivisions (definitions, nature of curriculum planning, theoretical assumptions), (2) discussions of approaches to curriculum development, and (3) work in psychology of learning applied to instruction. We conclude the section with some observations concerning similarities and differences between the literature specific to higher education and that developed with a primary focus on pre-college education.

Building on the literatures described in Sections I and II, Section III selects and describes a framework that will guide our efforts to work systematically and cooperatively with collegiate programs in assessing the impact on students of variations in curricular planning and implementation. This section also establishes operational dimensions of curricular terms in order to describe a model that can be field tested.

Context for the Report

Prior to presenting the three sections outlined above that form the body of our report, it is important to establish the context in which our work begins by briefly reviewing recent critiques of and recommendations for improving college curricula. We will return in Sections I and II to closer analyses of some of the specific recommendations that currently are being discussed in American colleges and universities.

During 1984 and 1985 several reports on undergraduate education were published. Some reporters put the number of such reports at ten or more; the count depends on whether one includes regional reports or reports on specific but common programs such as teacher education. These reports, which uniformly express the belief that the college course of study is in some need of revision, have produced a special context for our work. According to many surveys, faculty and administrators on most American campuses are actively reviewing their academic programs and are more receptive than in recent years to self-examination and to studies that relate various educational practices to measures of student outcomes.

The three most frequently discussed reports, *To Reclaim a Legacy* (Bennett, 1984), *Involvement in Learning* (The National Institute of Education, 1984), and *Integrity in the College Curriculum* (Association of American Colleges, 1985), concentrate on undergraduate study although all make recommendations that have implications for graduate study as well. Although their specific emphases differ, all espouse liberal education and its associated goals as the most important course of study during the undergraduate years and all state or imply that liberal education has been seriously eroded by increasing specialization of course content and encroachment of a vocational mentality. Each report presents a plea for redefinition of the undergraduate experience– a clarification of what "going to college" should mean. And, while celebrating the diversity of American higher education, all were critical of the burgeoning power and autonomy of the academic department, a development that is blamed, in large part, for the inability of educators to agree on what a student should know in order to be granted a college degree. All called for a renewed emphasis on faculty concern and on teaching excellence. In short, the reports reflected a widespread concern that political, social and economic pressures of recent years, including an increasingly diverse student body and predictions of falling enrollments, have stretched the higher education enterprise out of shape and have led to a loss of educational vision. The curriculum, although variously viewed as skills to be learned, courses to be pursued, and subject matter to be transmitted, is the central concern of all three reports. All three imply the need to move away from elective educational experiences and toward a more prescribed pattern of college education.

The NEH report (Bennett, 1984) presents a definitive solution to stem the tide of curricular degeneration– study of the great works of literature and the cultural heritage will restore vitality and rigor to the curriculum. The report advocates the classics of Western thought as an antidote to what is generally described as the unmoored, drifting character of undergraduate education. It is particularly critical of the failure of colleges and universities to require students to study the humanities, saying that "few (students) can be said to receive an adequate education in the culture and civilization of which they are members." The report laments that a student can obtain a bachelor's degree from 75 percent of all American colleges and universities without studying European history, from 72 percent without studying American literature or history, and from 86 percent without having studied the civilization of classical Greece and Rome.

The report continues:

> The fault lies principally with those of us whose business it is to educate these students. We have blamed others, but the responsibility is ours. Not by our words but by our actions, by our indifference, and by our intellectual diffidence we have brought about this condition. It is we the educators– not scientists, business people, or the general public– who too often have given up the great task of transmitting a culture to its rightful heirs. Thus, what we have on many of our campuses is an unclaimed legacy, a course of studies in which the humanities have been siphoned off, diluted, or so adulterated that students graduate knowing little of their heritage. (p. 1)

The NEH report is unquestionably clear in its recommendations. While good teaching should be encouraged through hiring, promotion, and tenure decisions, the primary goal is for colleges and universities to establish a core curriculum with the study of humanities and Western civilization as its central, unifying purpose.

In a manner somewhat similar to the NEH report, the AAC report (1985) defines the "profound crisis" in American higher education as a collapse of structure in the curriculum brought about by uncontrolled indulgence of individual faculty and student interests. The tone of the criticism is equally acerbic:

> As for what passes as a college curriculum, almost anything goes. We have reached a point at which we are more confident about the length of a college education than its content or purpose.... The curriculum has given way to a marketplace philosophy...it is a supermarket where students are shoppers and professors are merchants of learning. It is as if no one cared, as long as the store stays open. (p.2)

As in the NEH report, blame for the state of affairs is laid on faculty members, who are charged with developing and protecting their own disciplinary interests at the expense of their institutions' educational integrity. In order to restore some common standards and expectations to undergraduate education, the report strongly recommends that the "responsibility of the faculty as a whole for the curriculum as a whole" be revived.

Although some basic deficiencies in the undergraduate course of study are noted—such as the failure of too many colleges and universities to demand that students take courses in humanities, foreign languages, international studies or science for non-majors—no one course of study is prescribed. Instead, the AAC report focuses on the desired product of education and views this product as most likely to be accomplished if students participate in nine "experiences" that will help them achieve general knowledge, behaviors, and attitudes characteristic of the alert and inquiring citizen and worker. The aim is a philosophical and moral inquiry that produces graduates with a "vision of the good life, responsible citizenship and human decency." Thus, the curriculum should emphasize wisdom rather than the sheer accumulation of facts. The emphasis is on "methods and processes, modes of access to understanding and judgment, that should inform all study." The nine experiences (in brief) considered essential to a successful curriculum are: (1) inquiry: abstract logical thinking, critical analysis; (2) literacy: writing, reading, speaking, listening; (3) understanding numerical data; (4) historical consciousness; (5) science; (6) values; (7) art; (8) international and multicultural experiences; and (9) study in depth (pp. 16-24).

One experience, a study in depth, is to be balanced with other experiences that are designed to achieve educational breadth. In espousing an emphasis on both the history of human achievements and the inquiry processes which have brought about these achievements, the AAC report indicates that the present "curriculum offers too much knowledge with too little attention to how that knowledge has been created and what methods and styles of inquiry have led to its creation." (p. 24) The major study "in-depth," as well as the breadth components, should include an emphasis on the process of inquiry.

While the AAC and NEH reports focus primarily on improving the course of study and how it is taught, the NIE report concentrates to a greater degree on the learning process. Nonetheless, it too expresses strong concern that "the college curriculum has become excessively vocational in its orientation, and the bachelor's degree has lost its potential to foster the shared values and knowledge that bind us together as a society." (p. 10) It recommends that all recipients of bachelor's degrees have a least two full years of liberal education. Beyond that, however, the report's suggestions for improving the quality of general education have more to do with teaching students to "learn how to learn" (p. 2) than with prescribing specific curricular content.

Educators are encouraged to examine and adjust the content and delivery of subject matter to match the knowledge, capacities, and skills they expect students to develop; to agree upon and disseminate a statement of the knowledge, capacities, and skills that students must develop prior to graduation; to ensure that students and faculty integrate knowledge from various disciplines; and to expand liberal education requirements to ensure that emphasis is given to developing capacities of analysis, problem-solving, communication, and synthesis.

Although the NIE report is less prescriptive than the others in its content recommendations, it expresses emphatically the belief that education would be significantly improved if American colleges and universities would apply existing knowledge about three critical conditions of excellence: finding ways to involve students more fully in their education, clarifying and stating high expectations for students, and assessing whether these expectations have been met. Thus, greater attention was paid by the NIE Study Group to integration of knowledge and to individualizing education to increase student responsibility. The focus is not only on what students learn but on how that learning is achieved and how it might be measured. Restoring excellence to higher education requires that colleges produce demonstrable improvements in student knowledge, capacities, skills, and attitudes between entrance and graduation and that these demonstrable improvements occur within established, clearly expressed, and publicly announced and maintained standards of performance for awarding degrees based on societal and institutional definitions of college-level academic learning. In making such recommendations, the NIE report (more than the other reports) speaks to various communities, including faculty, students, administrators, and public policy officials, each of which has a part in bringing about change.

In the wake of these reports, the United States Department of Education and several states, higher education associations and other agencies have most aggressively pursued the recommendations of the NIE report for assessing student outcomes. Numerous conferences and workshops have been held and good attendance has been highly publicized. A frequent theme has been to threaten some form of external assessment should the institutions not accept this responsibility. Indeed, the Southern Association of Schools and Colleges, a regional accrediting agency, has recently enacted a long-debated policy that requires candidates for accreditation to demonstrate assessment of student outcomes. Institutions in the southern region find themselves frenetically seeking ways to comply. Simultaneously, several institutions that had earlier begun assessment procedures and feel their curriculum has improved from using the results have sought and received considerable publicity (Northeast Missouri State University, 1984). Among administrators at least, and perhaps among faculty, there is intense interest in devising methods for assessing outcomes and for documenting "value-added" conceptions of postsecondary education. At the same time, the interest is coupled with a fear that institutions will be publicly ranked according to their aggregate assessment scores (El-Khawas, 1986) and that value-added approaches may be misused by external agencies and the public.

Another area in which rapid change may be observed is the reestablishment of core curricula, often focusing on the humanities. Numerous colleges are immediately devising core courses for freshmen entering in fall 1986. Too often, it appears, the core experience, frequently endorsed by humanities faculty whose courses are undersubscribed, is hastily conceived and implemented in order to report that the institution has responded to announced national imperatives.

Perhaps because the reports, at least as a group, have made clear which educational goals are considered to be in the best interest of students and society, somewhat less public attention has been given to the recommendation that institutions establish clear expectations for students. As yet, almost no attention has been given to the processes by which the college curriculum will be changed, to the connections between course design and student outcomes, or to the explicit relationship between the subjects currently taught in college and the more generalized characteristics generally viewed as desirable characteristics of educated students.

In a decentralized system, national reports are generally considered successful if discussion is stimulated. This certainly appears to have been an outcome of the recent group of reports that focus on needed reform in higher education. Thus, we write this review of the college curriculum literature in an atmosphere of apparent receptivity toward improvement. At the same time, the climate is one in which publicly announced action may seem more politically expedient than careful analysis of the problem and examination of alternative solutions. Too, as will become apparent, the research base that would assist institutions in carefully weighing the potential merits of curricular variations is extremely limited.

The Current State of Knowledge About College Curricula

Despite its long history, debate over the purposes of college education and the manner in which these purposes should be achieved has been rooted more in rhetoric than in research. The fact that the term curriculum has multiple definitions probably is both cause and effect for this rhetorical focus. Among other definitions, the term curriculum is used to mean (1) a college's or program's mission, purpose, or collective expression of what is important for students to learn; (2) a set of experiences that some authorities believe all students should have; (3) the set of courses offered to students; (4) the set of courses students actually elect from those available; (5) the content of a specific discipline; and (6) the time and credit frame in which the college provides education. Probably the most common use of the term is to encompass both a set of courses offered and the related time and credit framework. Even among knowledgeable individuals, this common usage leads to an interpretation of "curricular change" as meaning a change in the course listings, college calendar, number of credits required of students or other such dimensions of the framework in which learning typically is arranged. Consider as an illustration the following quote from a paper by an astute higher education researcher who was discussing the potential costs of implementing recently recommended reforms but who considered curricular change to be defined primarily by changes in courses offered or required:

> ...the range of conceivable curricular changes is almost infinite, and the effects on costs are extremely varied. For example, the substitution of philosophy for history in the graduation requirements will in the long run make little difference in cost, but the substitution of computer science for elementary mathematics may involve heavy additional costs for new faculty, equipment, library resources and clerical assistance. Still other changes may save money, for example, the substitution of business administration for chemistry.... The net cost of a curricular shift is the cost of the new or expanded program minus the cost of the discontinued or contracted program. (Bowen, 1985, p. 21)

Discussions of curricular change that focus on what is learned *within* the framework occur less frequently than discussions of the framework itself. When such discussions do occur they are likely to harbor strong values. Even among researchers, opinions about what college students should learn are often based on missionary zeal that may limit objectivity. Thus, in current discussions of educational quality, it is not unusual to find that well-known and typically objective writers cite as support for their own views the opinions of prestigious others with similar convictions rather than seek out the relatively few empirical studies that relate curriculum to student outcomes.

In the mid-eighties, the result of this cyclical process is a widely discussed reform literature in which the ambiguous term curriculum is frequently modified by several equally ambiguous adjectives such as "coherent " and "rigorous" or by undefined processes such as "integration." The curriculum is said to "lack integrity" or to be in "disarray" but the meaning of these terms remains subject to the interpretation of the speaker and listener. Is it the mission or purpose of colleges which lacks integrity? The set of courses offered to implement the mission? The choice of courses made by the students? The actual experiences students take away from the courses? The teaching styles and strategies chosen by the professors? Or all of the above?

As Dressel (1980) has correctly indicated, a theory of curriculum that could generate a set of interrelated and testable hypotheses is missing. Indeed, higher education lacks even agreement on basic terms describing the learning process. Such lack of agreement constricts vision of the types of curricular variations that might be considered.

To broaden vision beyond the mechanistic arrangements for learning in colleges, we must explicitly reject the common (but incomplete) definition of curriculum as a set of course offerings published in a bulletin or catalog. Such a definition requires one to confine curricular change to the even swapping of courses as in a game of checkers or, at best, deciding that some courses have more power or value than others as do the pieces in chess. We must reject also that definition which construes curriculum as the set of courses a student has taken. If, using such a definition, the student has not acquired the desired outcomes, the primary implication to improve learning is merely that a different set should have been studied. An appropriate definition of curriculum should allow more options for improvement.

To elicit the broadest possible set of ideas that may lead to positive curricular change, and following Schwab's (1973) idea that there are four commonplaces in educating (the learner, the teacher, the milieu and the subject matter), we take as a working definition the idea that curriculum is an *academic plan*. The plan includes:

1. The specification of what knowledge, skills and attitudes are to be learned;
2. The selection of subject matter or content within which the learning experiences are to be embedded;

3. A design or structure intended to lead to specific outcomes for learners of various types;
4. The processes by which learning may be achieved;
5. The materials to be used in the learning process;
6. Evaluation strategies to determine if skills,behavior, attitudes, and knowledge change as a result of the process; and
7. A feedback loop that facilitates and fosters adjustments in the plan to increase learning (Stark, 1985).

As will be noted later, the definition of curriculum as a learning plan is not original; similar definitions have been proposed by others working at different educational levels (e.g., Taba, 1962; Toombs, 1977-78; Gay, 1980). The breadth of the definition permits informed discourse and research to occur at all levels of curriculum planning: individual courses, program or departmental levels, and institutional levels. Nonetheless, because various definitions, most of which are limited in scope, are in such common use, it will be necessary to state this broader definition frequently in order to communicate adequately with faculty members and the public.

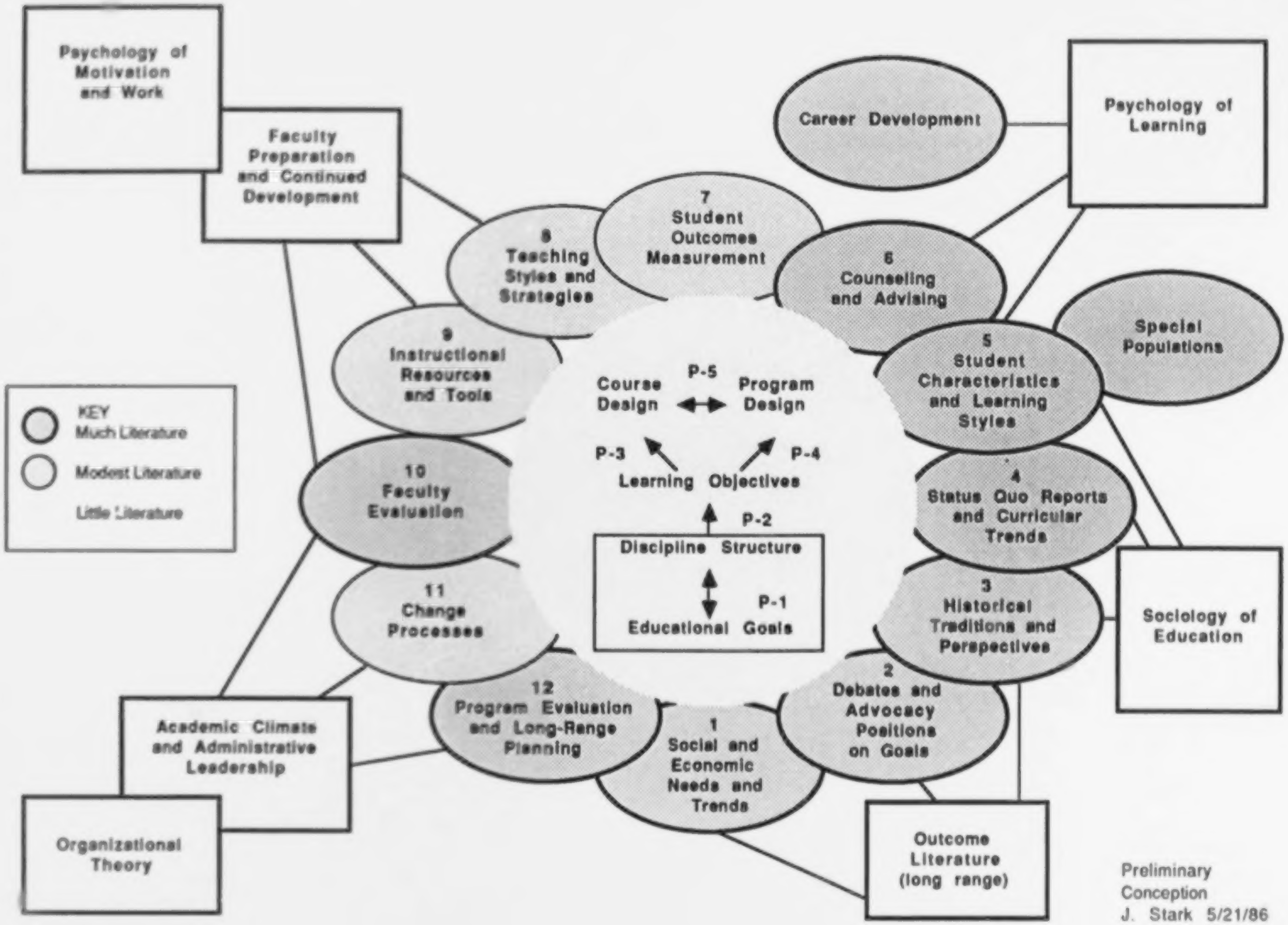
Boundaries of the College Curriculum Literature

Based on a definition of curriculum as a learning plan, one fruitful way to assess the boundaries of literature on college curricula is to consider what types of references a knowledgeable individual might recommend to a college faculty member who wishes to improve student outcomes by improving course or program planning. Clearly, the reading list would vary widely depending upon both the assumptions of the person constructing it and the situation of the faculty member requesting it. Using the definition of academic planning, Figure 1 provides an organizing framework illustrating many (perhaps not all) of the various topics in the higher education literature that could conceivably be included as important. We provide below a brief explanation of Figure 1.

In Figure 1, we show a core area of curriculum literature most directly relevant to our working definition of curriculum as an academic plan. Central within the core are learning objectives or intended student outcomes. In higher education, objectives are generally derived from the interaction of locally interpreted broad educational goals (depending upon societal needs, occupational needs, and institutional mission) with the structures of the disciplines into which humans have organized knowledge.

Also central to the core considerations are the processes by which the learning objectives are translated into a structured learning plan or design. The design (or plan) is constructed at one of two basic levels: (1) a design for a particular course, frequently the province of a single faculty member and (2) a design for a program of study offered by an institutional unit and expressing the faculty's collective educational judgment about what is best for a group of students. In constructing the plan, the faculty member(s) may draw upon (or ignore) to greater or lesser degree one or more of the knowledge bases in the twelve literatures surrounding the core (represented by ovals in Figure 1) which can contribute to the process of situation-specific curricular planning.

The ovals representing the types of literature in Figure 1 are arranged, insofar as graphic limitations allow, in a way that implies their proximity or overlap based on focus and origin in various contributing disciplines. Thus beginning at the six o'clock position and moving counterclockwise, one encounters (1) literatures stemming from history, philosophy and sociology that deal with the purposes, traditions and societal impact of higher education (Ovals 1,2,3); (2) sociological, then psychological literatures dealing with student characteristics, demographics and learning behavior (Ovals 3,4,5,6,7); (3) parallel literatures based in psychological, sociological and organizational studies concerning the role and behavior of the faculty (Ovals 7,8,9,10,11); (4) organizational theory literature dealing with the faculty role and change processes within the college or university (Ovals 11,12), and


Psychology of Motivation and Work
Faculty Preparation and Continued Development
Career Development
Psychology of Learning
7 Student Outcomes Measurement
8 Teaching Styles and Strategies
6 Counseling and Advising
Special Populations
9 Instructional Resources and Tools
5 Student Characteristics and Learning Styles
Course Design
P-5
Program Design
P-3
P-4
Learning Objectives
KEY
Much Literature
Modest Literature
Little Literature
10 Faculty Evaluation
4 Status Quo Reports and Curricular Trends
P-2
Discipline Structure
P-1
Educational Goals
11 Change Processes
3 Historical Traditions and Perspectives
Sociology of Education
12 Program Evaluation and Long-Range Planning
2 Debates and Advocacy Positions on Goals
1 Social and Economic Needs and Trends
Academic Climate and Administrative Leadership
Organizational Theory
Outcome Literature (long range)

Preliminary
Conception
J. Stark 5/21/86

Figure 1. The permeable boundaries of literature bearing on the college curriculum.

finally, (5) the relationship of the college or university to society as exemplified in planning processes intricately connected with social and economic needs that were the point of origin of the circle (Ovals 12,1).

To clarify the figure further, we provide three illustrations:

Illustration 1. Faculty members planning a community college vocational program may choose to: (1) adopt a particular position regarding the functional mission of higher education articulated and defended in the literature represented in Oval 2, (2) place primary emphasis on knowledge of social and economic needs and trends (the literature in Oval 1), (3) consider the particular characteristics and backgrounds of local students (Oval 5), (4) plan to link their program with institutional counseling and career development advising (Oval 6), (5) provide for the measurement of specific student skills (Oval 7), (6) attempt to acquire teaching equipment akin to that used in the current employment situation (Oval 9) and (7) provide mechanisms for program evaluation based on the extent to which completed students are successful in the work place (Ovals 7, 12). Optimally, such a group of faculty members will bring current knowledge described in at least these areas of literature into their planning process.

Illustration 2. A faculty member in a liberal arts or comprehensive state college who is devising a particular general education course may (1) articulate a position regarding the values of general education from Oval 2, (2) examine the position in light of historical traditions and perspectives (Oval 3), (3) consider characteristics of students likely to enroll in the course (Oval 5), (4) link the course to the institutional advising system (Oval 6), (5) perhaps attempt to change institutional structures such as distribution requirements in order to encourage students to take the course (Oval 11), and (6) consider the relation of student learning styles (Oval 5) to his/her own teaching strategies (Oval 8) in devising a specific course design. While the faculty member may not be aware of all the pertinent literature in the designated ovals, all potentially provide assistance in course planning.

Illustration 3. A faculty/administration committee seeking to institute a core general education curriculum to ensure a common learning experience for all students is likely to (1) base its efforts on specific reasoning that indicates such a core program is desirable (Ovals 1,2,3), (2) examine reports of core programs in similar institutions (Oval 4), (3) weigh the impact of faculty evaluation and incentive systems for participation in the new program (Oval 10), (4) study change process literature to assist in convincing colleagues of the value of their proposals (Oval 11), and (5) provide an evaluation mechanism to examine whether student learning changes as a result of the new program (Ovals 7,12).

Although it is likely that Figure 1 remains incomplete, clearly the boundaries that might encompass "the literature on the college curriculum" are very broad. Based on experience with the literature of higher education, rather than a systematic tally, we comment (subject to further test) regarding the extensiveness of the literature bases shown in Figure 1.

1. The most extensive literatures are those in Ovals 1,2,3,4,5,6,10 and 12. Much of the literature in Ovals 1-4 is persuasive; some literature in Ovals 5,6,10, and 12 is either research or includes recommendations drawn from research.

2. Modest but expanding literature may be found representing Ovals 7,8,9,and 11. A growing number of studies in these areas are receiving impetus from recent reform discussions.

3. Although literature at lower educational levels is abundant, a relatively small amount of literature is available with respect to the Core of Figure 1. Furthermore, there is almost no empirical research which has examined the several interactions of elements within this core which we have designated P-1 to P-5.

All of the literature described in Figure 1 may legitimately be (and has been) considered related to the college curriculum. But a review of college curriculum literature that included not only the central core of Figure 1 but all of the twelve literature bases and their disciplinary origins would be unmanageable. This same point has been made by Toombs, who believes that the scope of possible literature is so vast that curriculum will likely never yield to a general theory.

> The theory would have to encompass the range of individual behaviors, attitudes and values among young adults and other potential students. It would have to link the psychologies of learning, personality, and development into the formal and informal curriculum. On the faculty side, the relationship of a professor to his or her field of knowledge as institutionalized in the university would have to be accounted for, a feat which amounts to constructing a unified theory of knowledge and another for organizational behavior. Finally, such a theory would need to explain the relationship between institutions and society. (Toombs, 1977-78)

Because the scope of literature that might be viewed as applicable to curriculum is so broad, we have attempted to focus our search for curriculum literature on the area our working definition posits as the central core of the issue, namely the interaction of goals, disciplines, and learning objectives leading to the design of academic plans. Nonetheless, with Figure 1 as an organizing background for the varieties of knowledge that may be useful in developing academic plans in higher education, we will examine several commonly referenced reviews and source books to determine their focus on the various literatures and the extent to which they contribute to knowledge of academic planning at the course and program level.

I. A Summary of Major Writings on College Curricula

A. Recent Reviews of Curriculum Literature

Several professors who teach about curriculum in higher education programs designed to prepare individuals for positions of academic or administrative leadership have compiled readings on the college curriculum. In the process, some have created new terms intended either to clarify the meaning of curriculum or to narrow the range of literature that prospective administrators and faculty should read (Stark, 1985; Conrad & Pratt, 1986; Conrad, 1985). Similar efforts have been made by those employed in some colleges as instructional development specialists. These bibliographic efforts are reviewed here as a first source of material judged relevant by knowledgeable individuals.

In attempting to develop a compendium of readings about curriculum useful to faculty who are members of the Association for the Study of Higher Education (ASHE), Conrad queried forty-five faculty members who were teaching courses on the college curriculum as well as other contributors to the literature and obtained specific advice from an advisory board of sixteen members. He initially posed literature categories that included: (1) historical and philosophical perspectives; (2) curriculum planning; (3) undergraduate education (general education, concentration or major, professional education, occupational education); (4) content and skills (humanities, social sciences, natural sciences, computer and technological literacy, scientific and technological literacy, basic and advanced skills including writing); (5) graduate education; (6) curriculum change; and (7) curriculum evaluation. (C. Conrad, communication to advisory board members, circa fall 1984)

The final volume of Conrad's report (1985), constricted, of course, by space limitations, comprises three sections: "I. Historical and Philosophical Perspectives"; "II. Contemporary Viewpoints: Current Practices and Agendas"; and "III. Developing and Implementing Academic Programs." Conrad deliberately titled the volume *Reader on Academic Programs in Colleges and Universities* rather than reader on curriculum. In the introduction, he stresses the timeliness of the reader which is intended "to illuminate issues related to the "purpose, meaning and content of the higher learning" and notes that there was not widespread agreement among knowledgeable parties about what specific articles should be included. He cites, however, a diverse and substantial amount of literature on academic programs and indicates that "there is 'messiness' in addressing a topic as diffuse and amorphous as college and university programs."

In reference to Figure 1, Conrad and his advisory group chose to include in the limited space a number of articles from Ovals 2, 3 and 4, two from Ovals 11 and 12, and one from Oval 1. Five articles could be said to deal directly or indirectly with the core of curriculum design in Figure 1. (Conrad & Pratt, 1983; Phenix, 1964; Bell, 1967; Chickering et al., 1981; Nichols & Gamson, 1984). This selection of articles by experts in the field seems to illustrate, as well, either a lack of literature (or deliberate lack of attention to that which exists) in areas stemming from the psychology of learning, such as knowledge of student characteristics, instructional strategies, and course design. The selection of essential articles emphasizes the broad historical and philosophical debates about curricular purposes rather than curricular planning and implementation. Additionally, the predominant focus is on goals and mission at the institutional level rather than on the course or program level where curriculum development intersects with student learning activity.

In another publication, Conrad and Pratt (in press) reviewed extensive literature in an attempt to isolate and describe the "major threads of research on academic programs." They examined a pool of 465 studies from general higher education literature and dissertations. From this pool they excluded (a) the extensive body of essay and opinion (largely parallel to Oval 2 in Figure 1), and (b) all applied types of scholarship such as guidelines for conducting program evaluation (Oval 12) and curriculum planning (the core of Figure 1). In summarizing the purposes, frameworks, and methodology (rather than the content) of the 210 remaining studies, they then identified six major lines of inquiry about curriculum:

1. case studies of curricular "incidents" (Oval 4)
2. traditional and revisionist histories (Oval 3)
3. multiple site studies of academic change or conceptions of the change process (Ovals 4 and 11)
4. distributions and frequencies (including normative descriptive studies) (Oval 4)
5. outcomes (Oval 7)
6. conceptual frameworks that refine terminology or suggest potential avenues for organizing future research (core of Figure 1)

Conrad and Pratt emphasized their failure to find significant study of the relation of academic programs to educational outcomes or to the actual learning processes that students experience. In their words, "The learning process for which the curriculum provides a structure remains, at this time, largely unphotographed (in press, p. 37)." Further, they indicate that "no single journal article or book offers a comprehensive review of research on academic programs."

In a briefer review, Toombs (1977-78) cites three types of scholarship on curriculum which were brought into focus by the Carnegie Council studies. The first type includes monitoring studies with normative interpretations such as the transcript studies that trace trends in student course elections (Dressel & DeLisle, 1969; Blackburn et al., 1976). More such studies are currently being proposed (U.S. Department of Education, 1986). Toombs calls the second type the historical narrative of change and he presumably would include a variety of histories and such case study-based interpretations as Grant and Riesman's *Perpetual Dream* (1978). Lastly, Toombs cites descriptive essays or anthologies of essays which appear to have become a common way of dealing with the complexity of the curriculum in recent times. Such essays, whether brief or fully developed treatments, Toombs believes have kept the historical tradition of discussing the curriculum alive by pursuing such issues as general education (Bell, 1966; McGrath, 1976; Hook, Kurtz, & Todorovich, 1975; Gamson & Assoc., 1984) and relevance of content (Axelrod, 1969; Phenix, 1964; Kaysen et al., 1973; Ford & Pagno, 1964). We would add a tradition of discussion, perhaps more recent in origin, that focuses on issues of student needs, growth,and development, particularly the writings of William Perry, Arthur Chickering, and K. Patricia Cross.

B. Historical and Background Reports

Work of the Carnegie Council on Policy Studies

The Carnegie-sponsored historical development by Rudolph (1977) chronicles a theme of curricular responsiveness to society over the years of the nation's history. Rudolph characterizes the curriculum as a battleground for society, a locus and transmitter of values, a social artifact, a reproduction of the national ideal, a reflection of faculty research interests and student desires, a mixture of the cultural and the utilitarian, and sometimes a creature of convenience. One primary conclusion of Rudolph's history is that because of this pragmatic approach, the B.A. degree has become an umbrella for a variety of specialized and vocational programs and no longer has a meaning of its own. A similar theme is reflected in the *Integrity in the College Curriculum* (AAC, 1985) of which Rudolph apparently was a primary draftsman. One may easily infer another assertion, namely that curriculum planning should not be expected to be rational since societal change is not necessarily rational.

A second book in the Carnegie trilogy– *Missions of the College Curriculum* (1977), sought to assess the state of the forces on the battleground described by Rudolph and perhaps to predict the nature and direction of the next battle campaigns. The authors indicate that their goal is to accomplish four purposes:

1. Contribute to the slowly enlarging discussion on many campuses of curricular problems and possibilities
2. Set forth some essential information that may help in understanding the existing curricular situation
3. Present a view of the major issues of the current period and some suggested directions for change
4. Indicate some of the more effective methods in obtaining desired curricular change. (p. xi)

In this volume, curriculum is defined as "the body of courses that present the knowledge, principles, values and skills that are the intended consequences of the formal education offered by a college" (p. xiv). After establishing a brief historical context in which to view reported trends, the authors summarize recent changes, primarily increasing pluralism and diversity in the college curriculum, (for example, the granting of over 1500 separate undergraduate degrees) and increased responsiveness to students as consumers and to societal needs. Defining a college education as equivalent to an undergraduate program whatever its focus, the authors discuss credit courses taken at the pre-associate and pre-bachelor's degree levels.

The authors devote chapters to the internal and external forces shaping the undergraduate curriculum and two chapters to "components of the curriculum"— three main dimensions that are in constant interaction. These include (1) the range of subject matter that is taught and the way the institution is structured to accommodate different realms of knowledge, (2) the uses of knowledge for various purposes—depth, breadth, skills acquisition, and (3) the size, character and mission of the institution. Discipline is defined as "a discrete subject (including) its characteristic regimen of investigation and analysis." Structural aggregations of disciplines are divisions or subject fields. General education is termed "an idea in distress" while the major is billed as "a success story." Electives are viewed as abundantly available but used by students for various purposes. Basic skills are discussed under the heading "Where does college begin?" thus raising the question of the correct place for remedial work in the educational hierarchy. There are brief discussions of the relation of education and work and a superficial discussion of curricular change processes. The book contains only an occasional reference to empirical research. One of the most useful sections is an appendix which abstracts from Bowen's *Investment in Learning* (1977) a set of goals of higher education that were gleaned from over a thousand goal statements.

Perhaps because of its authoritative sponsorship (also by the Carnegie Council on Policy Studies in Higher Education), one of the major references on the curriculum is the *Handbook on Undergraduate Curriculum* (Levine, 1978). This widely quoted sourcebook catalogues the status quo in the mid to late seventies and presents anecdotal case studies of curricular innovations that have received a good deal of publicity. The term curriculum itself is never defined but the context makes clear that curriculum is assumed to be the course of study offered in colleges and universities with focus on (1) the type of courses and (2) the extent to which they are required of students. The report therefore takes the form of variations around the continua of (1) prescription versus free election, (2) discreteness versus interconnectedness of disciplines, and (3) general versus specialized education. The book contains chapters that might fall into several of Conrad and Pratt's classifications, particularly "case studies of incidents," "traditional and revisionist histories," and "distributions and frequencies," and into our Ovals 2,3,4,6, and 11.

Except in the brief review of various extant philosophies, the author presents little about where curricular reform should be headed or how the curriculum should be organized. Rather, the author provides a deliberately balanced treatment, accompanied by historical background, giving common pro and con arguments on various mechanical aspects of the way college curriculum is organized. Seemingly ignoring the extensive work of philosophers who have tried to capture the meaning of higher education (and whose work is reviewed in the book), Levine observes four different philosophies which he labels perennialism, essentialism, progressivism, and reconstructionism. These philosophies subsume several dimensions that other writers (such as Dressel) have tried to make more distinct, namely teaching philosophies, teaching styles, and disciplinary structures.

Those issues that are called "key elements" of the curriculum might well be viewed as functional components or organizational schemes at the institutional level. The elements, to which individual chapters are devoted, include:

1. General education
2. Major or concentration
3. Basic and advanced skills and knowledge
4. Tests and grades
5. Education and work
6. Advising
7. Credentials and degrees
8. Methods of instruction
9. Structure of academic time

For each element, Levine provides (1) a definition and historical background; (2) the current state of affairs (pre-1978); and (3) popular criticisms and innovative proposals. Among the more useful parts of the book are each chapter's concluding arguments for and against each structural prescription. As Levine indicates in the introduction, these are arguments which college faculties debate frequently at meetings, coming to different conclusions on each occasion, perhaps depending on who is in attendance. Because (1) empirical support for any position is lacking, (2) faculties are unaware of it, or (3) for various political and self-interest reasons, faculties choose to ignore it.

Another section of the book provides a summary of (1) major philosophies of higher education and biographical sketches of their proponents; (2) selected proposals for curricular change in the last fifty years; (3) a history of curricular highlights; (4) some characteristics of change processes; (5) some notes on international comparisons; and (6) a brief history of higher education since the ancient Greeks. The trend analysis of course distributions and majors offered clearly reflects one implicit thesis of Rudolph's accompanying historical volume (1977)—that the history of American higher education has consisted of cycles of loosening and tightening prescriptions.

While Levine fulfilled the task he apparently was assigned by the Carnegie Council on Policy Studies, that is, to describe the structural status quo, it is revealing that the task was assigned in this manner at all. (Followers of the Carnegie Council's work will recall that the works on curriculum were commissioned belatedly after criticism that its predecessor, the Carnegie Commission on Higher Education, had neglected to devote sufficient attention to the realm of teaching and learning.) Perhaps unfortunately, this catalogue-style reference book may have become an important source for college administrators interested in curricular trends. Yet it provides little guidance in conceiving the curriculum planning, teaching, or learning processes and very little reference to the content usually taught in college courses. Levine says (p. 15) that "the anatomy of general education is an undergraduate program." The analogy is well chosen since it is an anatomical description Levine provides. He fails to deal with the soul of the curriculum. Levine's book was rapidly outdated since it provided a list of bandwagons on which college administrators and faculty members could jump without devoting too much of their own thought to the process. Many of the bandwagons have rounded the corner as others have come into view.

In a subsequent and more conceptually based essay, Levine (1982) traces some of the sources and results of curricular reform since World War II, indicating that there has been almost relentless change in the predominant view of educational purpose as follows:

> 1960s—Education for life (relevance) and education for personal development. New interdisciplinary studies (ethnic studies, environmental studies) and reduced requirements including independent study, student-created majors, pass-fail grading and experimental colleges.

> 1970s—The American college became committed to social justice and universal access. New nontraditional students were admitted and, to accommodate them, variable scheduling, alternatives to courses, off-campus study, credit for experience and compensatory education were introduced. Eventually a strong concern for education and work emerged.
>
> 1980s—A revival of the reforms of the 1940s—a trend away from electives and toward greater structure. More prescribed distribution requirements except in two year colleges where requirements continue to be reduced. A concern for quality and its measurement. Increased concern about general as opposed to specialized education. Experimental colleges and free universities have almost disappeared.

Even though these changes have been rapid, according to Levine, many of the reforms of the sixties and seventies (e.g., pass-fail grading, independent study, student-created majors) remain in an institutionalized form. Reforms that took hold in non-selective colleges in tenuous financial circumstances now are found in the most assured and selective institutions. A continuing debate revolves around vocationally oriented studies (perhaps dating back to the early 1800s) with 60% of the faculty believing career preparation is not a very important college outcome and 70% of undergraduates believing it is essential. This compendium of curricular change in response to societal change illustrates rather clearly the complex interplay between the purposes and processes of education that has continually made curricular discussion vague.

An International Perspective

A summary of the "state of the art" in higher education curriculum throughout the world (Teichler, 1985) reveals that educators elsewhere also have observed short, cyclic swings in higher education curriculum matters similar to those that Levine has reported in the United States. Teichler reports that before the 1970s there had been, internationally, an increasing systematization of content, structure and provides several reasons: (1) the growth of knowledge required greater preparation of students before they could participate in advanced work; (2) professional associations and state examinations required some common preparation for entrance to professional occupations; (3) undergraduate education became separated somewhat from the research enterprise; (4) student transfer among institutions was more frequent; (5) students became more diverse in social and educational background; and (6) college teachers and educational systems became more accountable. According to Teichler, some of these trends toward systematization reversed in the 1970s, possibly because of a loss of common purpose in higher education, increasing attention to linking education with diverse occupational preparation programs, and debate over increasing bureaucracy.

Outside the United States, most programs in the "nonuniversity" sectors are clearly designed to prepare students for semiprofessional jobs. Thus, since collegiate-level institutions more often have a specific rather than multidimensional purpose, the arguments over liberal versus vocational focus (or whether higher education purposes are determined by the occupations or the disciplines) are less often heard than in the United States.

Requirements for a common core of learning vary widely among nations. In Japan, as in the United States, a common core of learning, usually directed at general education, is required. In comparison, East European countries often require a common core but in political economics or a technological field. In both cases the general goal may be socialization but the specific purposes differ. In Teichler's (1985) view the aim of student personality development in the United States (receiving less emphasis elsewhere) may be emphasized more broadly when the labor market value of higher education declines. He notes also that "objectives of this kind may be stated without any single direct provision being made to realize them; and outcomes of this kind have often been observed when no corresponding formal objectives have been set. This uncertainty about the relationships between objectives and means makes it difficult to establish direct and appropriate means to realize these aims." Such ambiguities seldom exist in those countries where occupational preparation is important.

Similarly, the degree of diversity and systematic treatment of curricular issues varies widely with national traditions. Teichler indicates that systematic principles of curriculum design may be more often used in colleges and universities elsewhere than in the United States. The extreme in lack of systematization may be Germany where students often study for specified examinations independently of a course structure. American universities have more structured programs than in some other countries. In many European systems, "governments approve individual programmes of each field of study at each university." The patterns of required and elective courses, periods when transfer between levels is allowed, examination systems, and other such organizational factors vary so widely across the world that they defy attempts to find broad descriptive patterns. There appears, however, to be a consistent trend toward centralization of curricular decision making accompanied by an increase in evaluation activities.

The Current American Scene

In general, the recent national reports (NIE, 1984; AAC, 1985; Bennett, 1984) cannot be considered updates of the curricular status quo since they primarily draw on earlier sources and syntheses rather than original data. Even so, documenting current levels of change and discussions about change is a popular form of research in higher education, particularly in response to various national initiatives. In *Campus Trends, 1985* (El-Khawas, 1986), a report that serves, in part, to update Levine's description of the college curriculum, policy analysts at the American Council on Education summarize recent changes and discussions reported by a representative sample of colleges and universities. The report indicates that active discussions on curricular issues has been stimulated by release of the three national reports on higher education. Examination of a similar survey conducted in the immediately preceding year (El-Khawas, 1985) gives reason to question this attribution; comparatively, the figures may as readily be interpreted as a rather stable continuous reassessment of the curriculum. In addition, there could be questions about whether the survey was seriously contaminated by socially desirable responses. It is difficult to imagine college administrators willing to report that their campus had refused even to discuss the various reports. Nonetheless, the survey is useful in documenting those issues perceived as important in curricular change.

We would judge from the questions asked that the definition of curriculum used in the report implies a focus on increased prescriptiveness in order to implement selected recommendations of recent national reports. In short, changing the curriculum means changing the number of requirements students must meet. The debate about what should be required appears active; 62% of the institutions reported discussions of the reports among senior administrators, 45% reported discussions at faculty meetings, and 28% indicated they had already taken action to change academic programs. What remains to be determined is whether implementation of student assessment procedures (the most active discussion) will take place in isolation or will result in changes in academic plans constructed by the faculty at the course or program level.

The recommendations receiving the most discussion and the approximate percent of campuses reporting these discussions in 1985-86 were:

Developing measures of student progress	51%
Systematic assessment of learning	45%
Emphasis on competencies	42%
Defining what knowledge is essential	35%
Using active modes of learning	33%

The report indicates that baccalaureate colleges are most notable for the extent to which they already follow many of the national report recommendations. Universities and community colleges are giving them added consideration.

More discussions may center on specific discipline-related competencies. For example, subject matter or competency areas under extensive review include:

Math or computer skills	87%
Writing	87%
Other competencies	89%
General education requirements	80%
Issues in science/technology	68%
Career preparation	52%
Values or ethics	46%
International education	43%

In light of recommendations in the various national reports, it is also instructive to note some of the curriculum-related topics that were being discussed in only a small percentage of colleges:

Deemphasize and change the major	15%
Prepare graduate students for college teaching	7%
Give importance to teaching/research	13%

Survey reports also summarize the extent of discussion about curricular change in areas such as new general education requirements, increase in course requirements, new attention to foreign language study, and greater attention to career preparation. Our comparison of percentages reported in these surveys over two years indicates that the extent of debate has remained quite constant.

In addition to the ACE reports, authors of other surveys also have reported resurgence of interest in general education requirements or a common core of learning for all students—a focus of all three of the national reports. According to a 1985 Carnegie Foundation survey (*Change*, 1985), belief in the importance of a core of learning is strong among American college administrators. Administrators rank "to discover the broad range of human knowledge through an introduction to the academic disciplines" as the most important of five goals proposed for undergraduate education and also the goal (of the five) that is achieved to the greatest extent. The Carnegie survey reports that 69% of public four-year institutions and 73% of all private four-year colleges have some general education requirements that apply to all students. The percentage is highest in liberal arts colleges and lowest in research universities, but the latter report they are undergoing extensive reexamination of requirements. It is not so clear that college administrators agree with the national reports that their institutions neglect general education. Despite the criticism, administrators are relatively positive that their general education programs are more effective today than in 1970— and more effective than programs of other colleges as a whole. Less than one-third think their programs have been sadly neglected or are far from meeting the faculties' expectations. Over 70% in all types of institutions felt the general education program is meeting students' needs. Although departmental "turfism" and competition from majors, specializations and career orientation of students were seen as significant obstacles to the improvement of general education, opinions concerning the proper locus of responsibility for change varied substantially by type of institution.

C. Prescriptive Views—The Quality Educational Product

What is an educated person? What knowledge is worth knowing? How is the appropriate knowledge acquired? How shall we recognize an educated person? American educators had begun to debate the first two questions in the early 1800s. The latter two questions have come into focus more recently as learning theorists discarded previously accepted axioms and began to explore the educational process. Today, the questions are not easily separable. Conrad and Pratt (in press) have indicated that both form and substance are involved in discussions of academic programs and that it is difficult, if not impossible, to discuss one without the other.

In a parallel way, many authors seem not to separate product and process when writing about the curriculum. Quite frequently, an advocate of a particular educational process feels sure that it automatically will achieve particular outcomes— student skills, behaviors, and attitudes. Similarly, authors who have strong beliefs about what students should know are likely also to believe that these ends can be achieved by a particular process. The two types of literature may start from different vantage points, but they often arrive at similar conclusions or use similar arguments to demonstrate their points of view. Although the distinctions are blurred, we have organized this review to discuss first those writings where authors seem to begin with desirable outcomes and then to infer how these outcomes can be achieved. Second, we discuss those writings where authors seem to begin with processes– usually particular curricular designs or teaching methods– and suggest that these processes predictably lead to certain outcomes. In both instances, most of the discussions are based on logical analysis or strong feeling rather than experimental results.

Recommendations of National Reports on Particular Educational Products

As previously indicated, although they might view different processes as most likely to reach the objective, the NEH and AAC reports were largely oriented toward a specific educational product, namely a conception of a liberally educated person. The NIE report, while more process-oriented, nonetheless includes a few prescriptions that come close to specifying a desired product.

The Bennett report is the most prescriptive of the three. It clearly states that a liberally-educated person– regardless of whatever other studies may be pursued– should be well-grounded in the humanities: history, philosophy, languages, and literature. The humanities are important, the report says, "not to just a few scholars, gifted students, or armchair dilettantes, but to any person who would be educated. They are important precisely because they embody mankind's age-old effort to ask the questions that are central to human existence" (p. 30). The educational vision expressed here is nostalgic, in that it looks to the wisdom of the past to inform the future. It encourages educators to teach students to "know a common culture rooted in civilization's lasting vision, its highest shared ideals and aspirations, and its heritage" (p. 31) and concludes that "it is simply not possible for students to understand their society without studying its intellectual legacy. If their past is hidden from them, they will become aliens in their own culture, strangers in their own land." (p.31) Thus the Bennett report is very clear about what knowledge is worth having and what an educated person should be. It specifies a general process through which the knowledge should be acquired– study of the culture– but lacks specific recommendations for how the knowledge should be taught and learned and provides no concrete ways of identifying the desired product. One could infer that knowing facts about the cultural heritage would meet the achievement criteria as well as interrelating broader principles of this culture or applying it to today's problems.

The AAC report (1985) is similarly clear about the purpose of education:

> Baccalaureate education has been and will continue to be a matter of prime importance to American life. Building on the foundations laid in elementary and secondary schools, it rounds off the education of students, enlarges their understanding of reality, and enhances their powers of intellect and judgment. It strengthens the capacities of individuals to grow as literate, educated persons and prepares them to pursue beginning careers in several professions as well as advanced studies as further preparation for practice in others. Above all, baccalaureate education makes a vital contribution to the health of American democracy. Leaders in a complex, pluralistic society require not only technical or professional expertise but the ability to make consequential judgments on issues involving the contextual understanding and assessment of multi-faceted problems. (p. 1)

Thus, the AAC report is clear not only about what knowledge an educated person should have but gives general guidelines about how the educated person might be identified. Such a person should have some ability to begin a career and should make complex judgments on both professional and societal problems. The abilities to be acquired, including the ability to think logically, write, read, speak, and listen effectively, explore values, and place events in contextual perspective provide a broad, but certainly not a detailed, outline on which to base educational process.

To the authors of the NIE report, the purpose of collegiate education is to teach students to "learn how to learn." Although mention of critical thinking, literacy skills, cultural knowledge, and inquiry methods as educational goals parallels the discussion in the AAC report, the NIE Study Group presented no complete prescription of what an educated person should know. The report does infer that some part of learning how to learn will be acquired through the process of studying the liberal arts (which remain more vaguely defined than in the other two reports). "All bachelor's degree recipients should have at least two full years of liberal education" (Recommendation 9). "Liberal education requirements should be expanded and reinvigorated to ensure that (1) curricular content is directly addressed not only to subject matter but also to the development of capacities of analysis, problem solving, communication and synthesis, and (2) students and faculty integrate knowledge from various disciplines" (Recommendation 10). "To balance the specialization of graduate training in the disciplines, graduate departments should require applicants for admission to present evidence of a broad undergraduate liberal education" (Recommendation 13). "Community colleges, colleges, and universities should supplement the credit system with proficiency assessments both in liberal education and in the student's major as a condition of awarding degrees" (Recommendation 12).

With the exception of the four recommendations cited above, most of the recommendations from the NIE report are process-oriented, directed toward how learning should be acquired and how it might be measured. The statements may be considered product statements because they support a specific type of knowledge worth having, namely liberal education (albeit not clearly defined).

A "Liberating" Perspective

The work of Gamson is mentioned here because it exemplifies the type of literature on which curriculum change is often based. A variety of similar recent works could be reviewed including books by W. B. Martin (1982) and J. Gaff (1983) and articles from nearly any issue of *Liberal Education*. Although each author contributes some distinctive ideas, the sheer number of such articles would make a review far too large. These writings begin with premises about what an educated person should know and infer that certain processes will lead to the acquisition of this knowledge. Typically, this genre of literature is persuasive or cites educational ventures believed to be successful, but it does not provide practical suggestions about how the success is to be judged.

Gamson's work clearly stems from a sense of conviction that undergraduate education should be largely congruent with general/liberal education and should involve students in an active learning community with their professors. Her recent work (1984) is based on advocacy for this position buttressed by case study investigations of several types of apparently successful liberal/general education programs and extensive observations in many colleges and universities.

In a historical introduction to her work prepared for the NIE Study Group, Gamson (1982) underscores the view that general/liberal education was undermined after World War II by a variety of factors including specialization and occupational emphasis and at this point "the education of undergraduates became shaped by the interests and styles of the disciplines" (p. 4) with depth receiving greater emphasis than the breadth, which should be the concern of the undergraduate years. These trends were exacerbated by entrance of new students but, according to Gamson, about 1978 (pp. 10-11) there began a wholesale move back to consideration of general education. The examples of programs cited by Gamson are varied and the emergence of core programs, she believes, provide more potential for coherence than the widely used distribution system of general education because they substitute programmatic choice for individual choice (p. 15).

In Gamson's terms, the curriculum is a statement or collective expression of what the faculty as a corporate body considers important to study (p. 29) and liberal education is defined as "a reasoned discourse about questions that matter" (p. 29). The interesting observation one might make about these definitions is their potential circularity; that is, if faculty and students should collectively choose "questions that matter" other than those defined by the liberal arts (for example, the problems of a specialization or occupational field) the curriculum would be denigrated by their collective judgment.

Despite the potential for circularity, Gamson's work comes closer than that of many writers to setting forth some principles of "generic learning" that might be used to assess whether an undergraduate program meets the spirit of liberal learning. This framework indicates that (1) life sets the agenda for the subjects to be considered; (2) subjects should be comprehensively treated; (3) subjects should be treated in a critical and reflective way; and (4) teaching should aim toward integration of ideas.

A Research Synthesis on Academic Outcomes

As discussed, the recent reports from national agencies and other popular authors in higher education have a good deal to say about what knowledge is worth having, and they make some inferences about how the knowledge should be acquired but say relatively little about how the educator will know if the desired capabilities have been successfully achieved. To some degree, all of the writers expound on the usefulness of the knowledge they advocate, either as general cultural background necessary for a successful life or, more specifically for ensuring contributions as a worker, citizen, and satisfied individual.

A research synthesis by Pascarella (1985a) does not purport to concern itself with curriculum or place value on any particular educational product but is relevant here because it provides a thorough review of empirical literature on college impacts, specifically, the attribution of cognitive and academic growth to that curriculum. The review considers studies using dependent measures of academic learning and those using dependent measures of cognitive development such as critical thinking, problem solving, conceptual complexity, and flexibility. Cautioning that "what we attribute is influenced substantially by the methodology we use and what is selected as the criterion (dependent) measure," Pascarella found that empirical studies typically have used non-experimental or quasi-experimental designs. He found few studies on college outcomes that used control groups, and, where such existed, the students were seldom assigned to treatment and control by randomization.

Within the limits of the lack of causality implied by the quasi-experimental designs employed, Pascarella cites overriding support in the literature for the idea that college, in general, increases students verbal reasoning, verbal comprehension, and mathematical ability. In most of these studies with positive effects, the institution as a whole has been studied as representing the dominant intellectual environment; there have been less conclusive results from research attempting to attribute student learning to differential characteristics of institutions. The problem in deciphering institutional effects is compounded by the fact that students are not randomly assigned to institutions; in fact most of the variance in post-test scores by institution is attributable to entering scores. Nonetheless, several studies have found student gains in the liberal arts college but not in community colleges or teachers colleges. Such results could support views that liberal arts study is the appropriate vehicle for achieving the desired educational growth or they may simply result from different student bodies. Pascarella cautions, however, that there have been only six reasonably complete studies of institutional effects over two decades and these frequently have used restricted ranges of institutions and students. He strongly suggests that the level of aggregation at the institutional level may be too gross to capture the effect of particular academic pursuits or institutional subenvironments on students.

With specific reference to differences in learning and cognitive development, studies show that individuals who are attracted to particular social environments will tend to change in the direction of that environment. This person-environment "fit" has been conceptualized in several ways but the residence hall, rather than the classroom has been the primary locus of research. In Pascarella's view, the single most comprehensive study relating context, fits, and interactions with cognitive development and thinking skills is that by Winter, McClelland and Stewart (1982), but this study did not use controls for entering scores of students on these characteristics. The small body of evidence focusing on the design of college classes to facilitate intellectual development have been based on the Perry scheme of intellectual development (Knefelkamp, 1974; Widick, Knefelkamp, & Parker, 1975; Widick & Simpson, 1978).

Pascarella suggests that:

> . . .the formal curriculum would seemingly be a natural place to look for the kinds of intellectual experiences that would foster critical thinking and general analytical skills. It is likely, however, that one would need to be quite specific in terms of the kinds of intellectual activities considered– content covered, amount and type of writing required, nature of tests or other evaluations and the level of intellectual discourse occurring in the classroom..... There is little (research) to suggest that broad curricular categorizations account for significant variations in the development of student intellectual flexibility. Certain specifically structured curricular interventions and instructional practices, however, appear to be positively associated with increases in this trait, as well as with critical thinking.

The designs of these studies are not particularly strong and more internally valid field experiments are needed. Pascarella suggests as one particularly powerful technique, sequentially integrated correlational and experimental studies. In this plan the correlational studies are used to suggest hypotheses; the experimental studies are designed to test them.

Among the several important suggestions Pascarella makes to guide the quality of future research is the suggestion that specifying the unit of analysis is essential. When using the student as the unit of analysis one is asking whether the college experience influences the student. When using the institution as the unit of analysis one is asking whether the aggregate characteristics of the institution affect the student. The demonstrable effects in the latter case have typically been quite small. Another suggestion concerns outcome measures used. Many studies have been based on data from the National Longitudinal Study in which academic measures are simple and short; others have been based on the Graduate Record Examination which tests specific factual knowledge and discipline-based theories and may not be sufficiently sensitive to measure gains in thinking or reasoning. Measures of student achievement and development are needed that are more proximate to the experiences we seek to measure, particularly when using institutional subenvironments as the locus of research.

D. Strategy Views—A Focus on the Educational Process

Introduction

As indicated earlier, we have somewhat arbitrarily separated literature primarily concerned with what students should know from that primarily emphasizing the process by which the knowledge, skills and behaviors should be learned. Although the distinctions are seldom clear, the previous section discussed illustrative writings which seemed to us to more clearly define product than process. We also summarized an extensive literature review indicating that few empirically-based connections have been made between product and process. Although the literature to be discussed in this section seems to emphasize process more than product, the desired product is often implied. Also, within this set of literature authors do not always clearly distinguish between the processes of deciding what is to be taught (content decisions), designing the learning plan (curriculum design decisions) and implementing the learning plan (instructional decisions).

The Educational Process Recommendations from the National Reports

Although the three national reports (NIE, 1984; AAC, 1985; Bennett, 1984) tend to agree that a liberally educated person is the object of undergraduate education, they differ substantially in the attention they devote to educational process.

The Bennett report devotes almost no attention to the educational process. Perhaps the single exception is the suggestion that: "Undergraduate study of the humanities should extend throughout the undergraduate career so that continuing engagement with the humanities will complement and add perspective to courses in the major field as well as contribute to students' increasing intellectual maturity as juniors and seniors." (p. 8) Although this report, like the others, recommends the improvement of teaching and adjustment of the reward system to promote good teaching, no specific guidelines are given concerning how material in the humanities is to be selected, designed for learning, or taught.

The cornerstone process recommendation of the AAC report seems to be its emphasis on a sequence of courses that develop advancing sophistication in literacy, numeracy, contextual and inquiry skills leading to "study in depth" or a capstone integrative experience. The report indicates that "study in depth, if it is to be disciplined and complex, cannot be restricted to the offerings of one academic department....It cannot be reached merely by cumulative exposure to more and more of a specified subject matter...Mastery of subject matter may be essential to the mastery of an academic discipline, but the discipline— the inquiry— is what leads to knowledge" (p. 28). The AAC report also recognizes that some mechanism for measuring student achievement is a necessary part of the learning process. Although

> higher education is not yet in possession of generally useful means for the sophisticated assessment of the general worth of programs or of the integrated cumulative intellectual growth and capacities of students... much can be done to improve assessment through encouraging better means of serious communication between faculty and students, locating faculty responsibility in a faculty committee on assessment and giving it appropriate powers, and building time for responsible assessment into a professor's day. (p. 34)

Thus, while the Bennett report recommends that the humanities, as important contributors to educational growth, be temporally parallel to other studies, the AAC report goes a step farther and holds that the various aspects of knowledge should be integrated into a cumulative, coherent whole.

> We do not believe that the road to a coherent undergraduate education can be constructed from a set of required subjects or academic disciplines. We do believe that there are methods and processes, modes of access to understanding and judgment, that should inform all study. While learning cannot of course take place devoid of subject matter, how that subject matter is experienced is what concerns us here... mastery of subject matter may be essential to the mastery of an academic discipline, but the discipline— the inquiry— is what leads to knowledge. (p. 15)

With the exception of emphasis on modes of inquiry that have informed human knowledge of the world, specific recommendations for achieving the desired integration are left undeveloped. The clear implication, however, is that faculty members themselves have integrated knowledge, know what needs to be done and need only to accept the responsibility to achieve this goal.

The majority of the recommendations of the NIE Study Group (1984) contain implications related to the process of curricular design or curricular implementation. All are directed at increasing student involvement as the key to learning. Involvement is defined as how much time, energy, and effort students devote to the learning process. The report includes recommendations on using active modes of teaching, increasing faculty-student interaction, selecting and disseminating clear intended outcomes for students, creating learning communities, attending to the knowledge, capacities and skills of students, providing systematic guidance as part of the academic plan, devising and conducting assessments of student learning, and improving teachers as planners and deliverers of instruction. As did the AAC report, the NIE Study Group endorsed "integrative mechanisms" that require students to reflect on the knowledge gained over several years of college. Within the suggested framework of clearly defined outcomes and development of assessment methods, it is possible to consider alternative directions for action in response to these suggestions.

Traditionally, the college curriculum literature has given more attention to product than to process. Thus, the fairly specific language and recommendations of the NIE report are less likely to be familiar to college faculty members than the more rhetorical tone of the AAC report. Because the NIE recommendations are more fully based in research findings, (for example, the work of Astin (1978, 1984) on student involvement, Pace (1984) on student effort, and Pascarella (1980) on faculty-student interaction), some faculty members seemed likely to view the report negatively as the work of "educationists." Yet, the current level of campus discussions seems to indicate that the time for greater specificity is here; process recommendations are being taken seriously, at least as a point of departure for curricular change. The next several sections examines the work of some writers who, while not always labeling their work as focused on the curriculum, have laid some of the groundwork for increasingly specific recommendations about educational process.

A Disciplinary Approach

Perhaps the most prolific analyst of college curricula is Dressel (1968, 1970, 1971, 1976, 1980; Dressel & DeLisle, 1969; Dressel & Marcus, 1982). In considering curriculum from multiple perspectives over a career of sixty-five years, Dressel appears to have moved steadfastly toward a conceptualization of curriculum as an comprehensive academic plan. The most thorough development of his ideas appears to be in a recent coauthored book, *On Teaching and Learning in College* (Dressel & Marcus, 1982). Because it synthesizes so much earlier work, this volume is difficult to summarize except by citing extensive lists of curricular characteristics that Dressel has developed more completely. Dressel has often reformulated and clarified the ideas of others as well, yet little of his work appears to have formed the basis for empirical study nor has Dressel recently attempted to test his ideas and numerous conceptual frameworks except through his extensive faculty and administrative experience and relationships.

While admitting that affective development accompanies cognitive development, Dressel takes the position that the purpose of college instruction is to promote cognitive growth of students. The primary objective of emphasis on cognitive growth is to make learners self-sufficient thinkers and continuing learners. Additionally, Dressel believes that the attention to the structure of the disciplines is essential in achieving appropriate educational outcomes and therefore in devising instructional plans. The disciplines, while artifacts of man's gradual intellectual development, have emerged as organizers of man's history and experience, thereby representing utilitarian classifications for organizing teaching and learning. Disciplines and their methods are tools for achieving understanding and gaining meaning in relation to one's environment. Consequently, the educated person must know about the objectives, methods, concepts and structures of disciplines and particularly about the interrelationship among disciplines.

While not mentioning formal constructs or terminology of cognitive psychology in his straightforward writing, Dressel clearly acknowledges the need for the learner to associate new experiences with prior experiences. It is the obligation of the college to provide a structure and arrangement for learning that will help the learner integrate the pieces of a course and relate it to other courses and experiences. The process of studying a discipline must therefore involve the assimilation of previous learning and may involve the creation of new concepts, relationships, and organizational patterns of knowledge.

The primary problem in current college learning is not, Dressel believes, with the disciplines themselves but "rather that teachers, having become so immersed in the disciplines, no longer view them in relationship to the basic problems and concerns of mankind" (Dressel & Marcus, 1982, p. xii). "The essence of good teaching is to adapt it to the particular context in which it is provided in such manner as to promote the student's inevitable search for meaning" (p. xvi). "The teaching must be based on the context in which it takes place and the contexts in which the subsequent learning is to be used" (p. 25). Thus, to represent the ideal educational process, Dressel has coined the term "contextual teaching."

Dressel makes a distinction between content and subject matter. Subject matter is the focus of human concern or the problem to be solved. Content is the mode of studying the subject matter (the problem or issue) through the use of one or more disciplines. Emphasizing the importance of "subject matter," Dressel rejects the idea that there exists a concept of "education for its own sake." Any education has a purpose (a focus or problem to be solved), he claims, even if that purpose is only to provide enjoyment. It is the idea that education is valuable in its own right, he believes, that has caused scholars to pass out tidbits of knowledge to students without relating them to anything and to call this process education. In this view, all teaching is problem-solving; problem-solving may be interdisciplinary but it may also use the methods of a single discipline.

In Dressel's terms, a discipline can be viewed as:

1. A field of study
2. A mode of inquiry

3. An organized body of knowledge

4. An interrelated set of interests and value commitments

5. A set of objects or phenomena that humans have tried to explain

6. A group of individuals sharing common concerns and interests in attempting to understand their world

7. A set of interrelated concepts and operations

In keeping with his ideas of purposefulness of education, Dressel chooses as most useful the idea that a discipline represents a systematic way of organizing and studying real phenomena by the use of abstraction.

There are a number of ways in which learning can be structured. These ways are guided by the disciplines because of their role in organizing knowledge. The purpose of these different structures is to help the learner achieve order, continuity, consistency, uniformity, and integration. For example, the disciplines

1. Build upon major concepts
2. Allow the learner to classify information
3. Allow chronological development of ideas
4. Allow sequential development of ideas
5. Allow for increasingly complex ideas
6. May be familiar or unfamiliar (near or remote)

Integrated learning in the disciplines encompasses five dimensions:

1. Content coverage— obligation to acquaint students with facts, concepts and principles that define the basic content of the disciplines.

2. Emphasis on mode of inquiry— includes both the means of inquiry and the logical and organizational structure of the discipline.

3. Application of the discipline

4. Emphasis on the values and biases implicit or explicit in a discipline and its application to people and society.

5. Emphasis on selection of experiences for immediate and long-term personal development and social needs.

Dressel claims that teaching has shifted to a narrow conception that focuses on the specific knowledge rather than the ability to organize and apply it. Learning involves not only specific information but thought, values, processes, materials, and structures for organizing the experiences and the environments in which the experiences will be provided. Thus the teacher has responsibility to understand the context in which the learner is operating and the ways in which the learning is to be used.

Following the work by Phenix (1964), Dressel and Marcus (1982, pp. 108-133) suggest five major components of disciplinary structure, each of which has several subcomponents (not included here):

1. Substantive, perceptual, and conceptual component. (What are the types of problems with which the discipline deals?)

2. Linguistic, mathematical, nondiscursive symbols and technical language component. (What is the symbol system that allows expression of the unique aspects and relationships?)

3. Syntactical or organizing component (disciplinary principles, procedures and skills along with assumptions and limitations that define a field and mode of inquiry). (What are the ways in which evidence is collected, organized and interpreted?)

4. Value component. (What is worth studying and how it should be studied? Since the concept of worth changes with changes in the real world, value components are partly defined as the learner having a satisfying or aesthetic reaction to having learned.)

5. Conjunctive component. (What is the relation to other disciplines?)

According to Dressel, teachers cannot fully understand or apply (or presumably teach) without some grasp of these five components embedded in their disciplines which markedly influence the discipline's nature and further development. "Disciplines have come to have intrinsic value to the specialists in them, whereas the learner seeks for their extrinsic values" (p. 161). Dressel and Marcus assert that:

> For effective learning, a student needs a framework made up of an appropriate set of clear stable concepts, principles or ideas at various levels of generality or inclusiveness. Such a structure provides the optimal possibility for correlating, anchoring, bridging or grouping new ideas in relation to those already known by inserting (subsuming or superordinating) them in the existing framework. (pp. 164-165)

The types of concepts required for such a structure are those that relate to Dressel and Marcus' five components of disciplinary structure.

Dressel and Marcus emphasize the importance of recognizing that the disciplines are artifacts of man's experience and of relating them to each other through his ideas of transdisciplinarity. Briefly, these dimensions are believed common to all disciplines:

1. Ideas
2. Rules
3. Generalizations
4. Principles or laws
5. Theories
6. Problems
7. Aspects of life and life processes

Commonalities among the disciplines can be categorized in another way. All have characteristics such as:

1 Methods of classification (taxonomies, typologies, and ideas of sameness and difference)
2. Units of measure for counting, ordering or sequencing
3. Clarification of relationships between idea and real
4. Values
5. A range of relationships (such as constancy and change, change and variation, dynamic stability)

Similarly, criteria for selection of concepts to be taught are similar across disciplines:

1. Important central, key, or fundamental ideas
2. Ideas transmittable through planned educational experiences
3. Ideas based on or related to research
4. Ideas that stimulate the search for meaning and encourage further investigation
5. Ideas that interrelate facts and lower level concepts
6. Ideas useful in decision making
7. Concepts that are directive, cumulative, and integrative

The work of Dressel and Marcus contains a number of other useful frameworks. For example, they propose that "humanizing education" transcends the disciplines, and they suggest six humanizing competences. From these they move quickly however, and without empirical evidence, to a lengthy list of specific educational experiences which seem to be based on a specific philosophy of education. The list illustrates well the problem that is found in much of the writing on curriculum; that is, it incorporates a large conceptual leap from purpose to specific experiences that are believed to achieve broad outcomes. In one sense, the set of competencies and experiences violates Dressel's own idea of contextual teaching since the list is posited without knowing the specific students nor the context in which they will learn and use the information. On the other hand, Dressel and Marcus may assume that the context is today's society and they phrase the competencies and experiences in sufficiently general terms that they would be hard to argue with, at least for those who advocate general education.

Within this discussion of competences and potentially related educational experiences, what is most instructive for a consideration of curriculum planning is that Dressel and Marcus mention briefly four sets of curricular implications that must be included in order to move from statements of desired competences to educational experiences. Although it is not clear how or if the authors actually used these in developing their own scheme, the four are: (1) clarification, (2) range of application, (3) relevant learning experiences, and (4) evidence of accomplishment. Potentially, it seems, these four implications could form one dimension juxtaposed against any selected set of educational objectives in order to provide a matrix for curriculum planning.

Dressel and Marcus outline four major teaching styles (also covered in Dressel's previous book *Improving Degree Programs*, 1980) which are not too different from those put forth by Axelrod in *The University Teacher as Artist* (1973). The four teaching styles are (1) discipline centered teaching, (2) instructor centered teaching, (3) student centered cognitive teaching, and (4) student centered affective teaching. What is interesting about Dressel's formulation is that the teaching styles are set forth in a chart (Dressel & Marcus, 1982, pp. 10-11) with a list of components showing the assumed emphasis on content, instructional method, classroom climate, etc. associated with each style. This is a valuable table to examine but it may contain the dangerous implication that faculty members who generally espouse a particular teaching style are restricted to the components typically associated with that style (p. 12). Dressel's own preference apparently would be for a combined version of discipline centered teaching and student centered cognitive teaching. The authors do not juxtapose the four styles of teaching against the organizing structures of the disciplines but that could be done, perhaps with interesting results.

Dressel and Marcus also describe five philosophical views on teaching (p. 28):

1. Theocentric teaching makes divine sovereignty and glory the central truth, with all other truth dependent upon or emergent from that ultimate source (e.g., bible colleges).

2. Egocentric teaching emphasizes the work of the accumulated knowledge in the disciplines (e.g., liberal arts colleges committed to majors and distribution requirements).

3. Sociocentric teaching places individual service to society (or to the nation) at the center of the education. (e.g., social sciences and many interdisciplinary programs).

4. Idiocentric teaching assumes that a democratic society requires maximal individual development (e.g., commitment to humanistic psychology).

5. Egocentric teaching highlights the individual instructor as a model for emulation (e.g., emphasis on the professor's individuality rather than that of the students).

It would be possible also to juxtapose these philosophies against the teaching styles presented earlier, although Dressel and Marcus do not attempt this. It is not clear that the belief systems and the teaching styles are independent or that either set consists of mutually exclusive categories.

Clearly, the writings of Dressel (alone and with others) contain much grist for thinking about the college curriculum. Some of these ideas are echoed faintly in the various national reports; others appear to have untapped potential.

The Curricular Notions of Halliburton

One of the few writers in higher education who has focused on curricular design is David Halliburton (1977). In two wide-ranging chapters, Halliburton stresses his belief that the disciplines and their underlying paradigms play a large part in determining not only what one studies or teaches but how one proceeds with teaching and learning. The disciplines reflect the assumptions, values, and habits of their practitioners. A primary reason for being concerned with curriculum reform is that curriculum becomes obsolete because (1) the role of education changes with respect to broad historical and social needs, (2) new trends occur within the higher education system itself, and (3) the disciplines undergo paradigmatic shifts (or changes) in accepted assumptions (p. 37).

Despite these encouraging ideas set forth in the introduction to his work, Halliburton backs away from dealing with these disciplinary paradigms in any depth, claiming the task impossible in light of the complexity and bulk of today's curricula. Rather, under the topic of curricular design, he discusses some broad principles and relates them primarily to innovations in the 1970s, namely interdisciplinary programs, competency-based liberal arts curricula, and intensive or experimental academic calendars.

Halliburton talks about a new set of "disciplines" to be distinguished from the organized disciplines and identified by their practicality of preparation for life. For example, he includes (a) the mode of calculation and logical argument and analysis (numeracy); (b) the mode of experimentation (design); (c) the mode of natural history or relation of organisms to the environment; and (d) the discipline of esthetic form. While these disciplines remain fairly distant from the typical curriculum plan, Halliburton uses the realms of meaning proposed by Phenix (1964) to bring them a little closer to congruence with actual college programs. As an example of constructive translation of such organizational frameworks to actual learning plans, Halliburton cites the Mars Hill College competence-based curricula. In his view such a plan moves us in a desired direction toward sharpened concepts of both core curriculum and competence curriculum and recognition of their linkage.

Halliburton indicates that curricular change typically proceeds according to one or more of three processes that represent paradigms of education based on underlying assumptions: (1) mechanism-ism or statics (exemplified in tinkering or curriculum maintenance rather than overhaul, and based on the vision of the student as an empty vessel to be filled; (2) dualism (curriculum change that swings from one popular trend or focus to another, based on an assumption that teaching is separate from learning; and (3) knowledge-ism (a focus on acquisition of content rather than learner development). Escape from these assumptions "will depend upon our learning to see the curriculum as a process that is subject to change, and our discovery of how to bring about change" (p. 45). Currently, mechanism, in particular, is the "prisoner of its paradigm."

Drawing on the work of others, Halliburton (p. 47) sets forth several principles for curriculum planning:

1. The learner needs structure
2. The learner needs meaning
3. The system needs a built-in process for effecting curricular change
4. The curriculum should be parsimonious in terms of course offerings
5. Every level of the curriculum should be articulated with every other level
6. The teacher should be a facilitator of learning
7. Curriculum planning should include evaluation

In his examples of productive interdisciplinary approaches (an approach which requires an integrating concept), Halliburton suggests that the course could be problem-oriented, or could focus on figures (notable persons), emerging fields, interpretation, discovery and the future. He does not make the point (as do Dressel and Marcus) that these types of approaches could also be applied to courses within the discipline. Rather, he lists six advantages but only one disadvantage of an interdisciplinary curriculum. An interdisciplinary curriculum can: (1) deal with problems not adequately addressed by conventional disciplines; (2) create dissonance that pushes disciplines toward new possibilities; (3) upgrade disciplinary offerings; (4) bridge gaps between academic constituencies; (5) sharpen the self-definition of the disciplines; and (6) provide a place for regularized change or innovation. Its disadvantage is that it could replace departments; and thus the institution would lose valuable leverage and a mechanism of quality control currently residing in the departments.

In discussing curricular change, Halliburton asserts that any curricular change requires a change in both the role of the teacher and the role of the learner. Furthermore, every gain is likely to entail a sacrifice in some other area (such as when interdisciplinary courses weaken departments). Perhaps as a consequence of these complex interactions, curriculum design does not follow a linear model of planning (specify aims, select experiences, determine the content, evaluate, adjust) as so many theorists assert it does. Actually the model is either a "follow the leader model" or a dialectic which takes into account (or should) the institutional mission, capability, learner needs and cost concerns. After these factors come into play, curricular change tends to be classifiable on one or more of several continua: more specialization to less specialization; concentration to diversity; disciplinary to interdisciplinary focus; and concurrent-course to intensive-course format.

Like Dressel and Marcus' listing of specific experiences to achieve postulated humanizing competencies, Halliburton's work veers away from the design process and verges on the category of prescribing the educational product when, in his conclusion, he indicates that overall, an adequate curriculum design should provide for:

1. Experience in different disciplines, different cultures, and different value systems in addition to the learner's own.
2. Experience in dealing with the learner's cultural heritage.
3. Experience in dealing with current problems, both in relation to traditional approaches and to newly-developed approaches.
4. Life and work in a community, including some collective academic and social activities.
5. Independent study, focusing on an area that the learner has defined or helped to define.
6. Practice in communicating by speaking and by writing.
7. Continual contact, on a close basis, with faculty members.
8. Continual evaluation, including self-evaluation.
9. Involvement in small, personal and large impersonal learning situations.
10. Involvement in long-term and short-term learning situations.
11. Personal development.
12. Aesthetically creative activities and play. (p. 73)

A Curricular Classification by Bergquist

Building primarily on cases he judges to be "non-traditional" and expanding earlier classifications by others, Bergquist (1977) constructed an eight-category curricular classification system and arranged the types of curricula in a circular pattern based on an assessment of their similarities and differences. He includes: (1) heritage-based curricula (e.g., Western civilization); (2) thematic curricula (focusing on problems such as the environment); (3) competency-based curricula; (4) career-oriented curricula (integrating liberal and occupational studies); (5) experiential curricula (ranging from simulations to international travel); (6) student-based curricula (independent study, tutorials, learning contracts); (7) values-based curricula, and (8) futures-based curricula. The two pervasive issues addressed by these models are (1) generality versus specificity and (2) prescriptiveness versus electiveness.

According to Bergquist, the advantage of many of these distinctive schemes is that they allow students to pursue career goals that are a strong motivating force today while not neglecting cultural heritage, values, and thinking skills. They also allow an institution to develop a curriculum that is distinctive in keeping with its mission and serves the needs of diverse students, thus stemming a tide toward institutional sameness noted by many higher education observers. Since colleges typically look to other colleges for models of curriculum design, the categorization can become a common language in which conversations about curricular change can be established.

As Bergquist recognizes, the eight categories mix dimensions of content and dimensions of process. Additionally, the scheme remains incomplete. The author indicates that at least five more dimensions would be incorporated in a more sophisticated system for classifying nontraditional curricula: "(1) curricular breadth (for example, cross-cultural, cultural, regional, problematic, and experiential); (2) curricular control (student, class, instructor, department, discipline and institution); (3) instructional process (lecture, discussion, audio-tutorial, programmed text and experiential); (4) curricular structure (concurrent scheduling, modularized scheduling, self-paced scheduling, and credit-for-experience); (5) curricular outcomes (knowledge, skills, awareness, and values-clarification)" (1977, p. 85). While stressing the desirability of such a system, Bergquist did not proceed with its construction nor have we found any empirical test of his partial scheme either in terms of replicability of the classification or relation of the models to student outcomes. It appears that the detailed cases provided by Bergquist (pp. 87-109, 175-246) would allow a beginning for such data-based studies. Such research would necessitate examining both time allocated to the various dimensions (which is the core of Bergquist's analysis) and the way in which time is actually used by the institution, instructors, and students. It appears also that, although Bergquist derived his schemes primarily from non-traditional or distinctive small colleges, if one were to examine course syllabi rather than institutional catalogs, attention to such curricular orientations may be found in standard college courses to a greater extent than he supposed.

To carry this line of work further, Bergquist, Gould and Greenberg (1981) propose six generic dimensions of all college curricula and attempt to show how they can be used in curricular design. The six are:

> 1. Time: Duration and schedule of instructional units.
>
> 2. Space: Use of instructional and noninstructional areas both on and off the campus.
>
> 3. Resources: Instructional use of people, situations, and materials, both on and off campus, from instructional and noninstructional areas.
>
> 4. Organization: Arrangement and sequencing of instructional units and arrangement of academic administrative units.
>
> 5. Procedures: Planning, implementing, evaluating, and crediting instructional units.
>
> 6. Outcomes: Defining the intended desired results of a particular instructional unit or academic program. (p. 5)

The authors propose that these dimensions are arranged in a hierarchy of importance, from least important (time) to the most important (outcomes) and that the importance is inversely proportional to the ease with which changes can be made. That is, it is relatively easy to change the time dimensions of the academic program but relatively difficult to change the intended outcomes. The lower level dimensions require only structural changes, whereas the higher level dimensions require changes in processes and attitudes as well as structure (pp. 6-7). Numerous examples of the variations on the less important dimensions are given, reflecting the focus found in other higher education literature on curricular change.

The Case for Curricular Design

Possibly the most detailed (and perhaps least known) conceptual work on the curricular process in higher education has been done by Toombs (1977-78). Toombs judges that there is agreement on a general definition of a curriculum as "a set of learning experiences intentionally organized to sustain and encourage the process of learning toward certain expected outcomes." He points out, however, that for many faculty the term represents a level of abstraction they often do not think about. "There is no elaborated vocabulary or technical terminology to describe the very complicated set of human experiences and intellectual suppositions that make up the curriculum." (p. 19) "The search for an adequate set of "outcomes" to describe the integrated and interactive effects of courses on students has demonstrated the conceptual scarcity" in this area (p. 19).

Further, Toombs indicates that there is an absence of an observational technique that provides a neutral, comprehensive, and systematic way of laying out the features of a curriculum as they exist at a particular point in time. A variety of suggestions are presented and ruled incomplete as frames of reference: for example, a historical view of the curriculum provides one common ground for discussion, the structure of knowledge another.

"Theories about the nature of knowledge (Phenix, 1964) are highly significant, in a particular way, but do not comprehend the full scope of curricular concern." (p. 21)

In Toombs' view, even in the public school setting where theorists have been preoccupied with finding a comprehensive theory of curriculum, the effort has failed. While the secondary school literature has some relevance for higher education, Toombs believes the yield is likely to be very low.

Toombs proposes that the notion of design (used in different ways in both art and engineering) provides a prospect for organizing thinking about curriculum that is free of historical preconceptions and disciplinary stereotypes. According to various sources he cites,

> Design is the process of inventing things which display new physical order, organization form, in response to function.... Curriculum as design implies invention. (Christopher Alexander, an artist)
>
> Design is thinking behavior which conceptually selects among a set of alternatives in order to figure out which alternative leads to the desired goal or set of goals.... (Churchman, 1971)

So that the design concept can be developed into an analytical approach to the collegiate curriculum, the key design concepts of content, context, and form must be elaborated into a set of appropriate subsystems, preferably hierarchical. The analytical mapping Toombs attempts includes on one axis different ways of addressing a particular curriculum component, namely, commonly defined philosophical positions in education: realism, idealism, empiricism, pragmatism and existentialism. On the other axis are subcategories of the curriculum: content, context, and form, and possibly evaluation. In using his scheme to map recent curricular changes at several institutions, Toombs reports that the mapping process highlights salient dimensions of curricula. Beyond that,

1. "...There is now an emphasis on process...concern with acquisition of knowledge to deal with interpreting, criticizing and applying as cognitive activities...attention to skills...writing, speaking, calculating." (p. 26)

2. Wide acceptance for "the desirability [sic] of integrating knowledge and bringing a sense of unity to the learning experience." (p. 26)

3. "The idea of a body of common learning based in a set of required courses has reappeared..." Courses are "intended to introduce the student to" the field...its content, methodology, and social significance..." they facilitate choice "rather than promote universal culture." (p. 26)

Instructional Development Strategies

Although many major universities have instructional development offices, one of the most systematic and carefully designed processes is that used by Diamond and his colleagues at the Center for Instructional Development at Syracuse University and described in a resource book (Diamond et al., 1975) This resource book is based on the assumption that the professor is the knowledge expert and the instructional developer's role is to help the professor with a process of logical thinking about course structure. The course structure begins with the simultaneous processes of setting objectives and agreeing upon evaluation strategies and ends with materials production, feedback, and revision. Recommendations for establishing successful projects include careful assessment of student needs and attitudes, resources and facilities, and administrative support. To a large extent, the work that has followed this model has as one of its objectives the creation of individual options for students in large introductory courses. It is probably one of the most complete systems in higher education to assist selected faculty in developing a total academic plan.

Other Important Contributions

Of the various ovals representing specific curriculum-related literatures in Figure 1 describing various societal needs, historical traditions, and philosophical views on education probably are referenced most in discussions of curriculum. In recent years at least, the literature in Oval 5, representing student characteristics and learning styles, has received increased attention. Consistent with Dressel's view of "contextual teaching," a number of researchers and synthesizers have factored students and their individual abilities and needs into the curriculum design equation. The works of several of the best known writers, Arthur Chickering, K. Patricia Cross, William Perry, and C. Robert Pace are reviewed here as not only representative but because they have fostered a large number of local studies in colleges across the nation. At the risk of ignoring important theories and frameworks, an effort has been made to select from these writings the ideas most specifically related to college curricula. In reviewing this body of literature, we and others (Astin, 1983) have been struck with the difficulty of finding illustrations to demonstrate relationships between developmental theory and educational practice. This problem has also surfaced in K-12 literature on student development (Egan, 1979).

Student Achievement and Student Effort

Following a long career of research on the impact of the colleges and university environment on students, C. Robert Pace compiled a substantial review of college outcome research (Pace, 1979). Although he also cited studies of alumni and of the institutional environment, Pace's review is unique in bringing together for the first time the results of major surveys of student achievement. His conclusions are relatively simple. Not only do students know more after attending college but "what they know is related to what they studied" (1979, p. 36). Students know more about their major fields and closely related subjects; their achievement scores may even decrease in subjects they have not studied in college such as mathematics and foreign language which are not required of all. Furthermore, Pace maintains that cross-sectional studies have not produced substantially different results from longitudinal studies. Several factors, he believes, have limited the availability of research results on student academic achievement: (1) tests are expensive and institutions have not implemented wholesale testing programs beyond the 30 to 40 classroom final examinations a student may take over a four year period; and (2) much information may be contained in self-study reports, but these are typically not published.

Pace holds out the hope that increasing focus on self-studies, particularly those associated with accreditation processes, will result in an improvement in this knowledge base. He indicates, however, that the conclusions of fifty years of research are unlikely to be reversed; that is, it is unlikely that we will find that students who do not attend college learn more than those who do or that students who did not study a subject learned more than those who did. Undoubtedly because of lack of an accumulated data base, Pace's research stops short of connecting achievement results with any particular type of curricular design or learning structure. He does indicate that outcomes other than achievement results are important and argues for studies that include and consider the interaction of growth in both academic achievement and affective variables.

Building on the model reproduced in Figure 2, Pace recently has turned his attention to the student's role in taking advantage of learning opportunities in the environment. Some observers see this new approach as an ingenious and creative contribution that has potential for changing our whole approach to examining the college experience (Curtis, 1980). Pace's thesis is simple: "Accountability for achievement and related student outcomes must consider both what the institution offers and what the students do with those offerings." The College Student Experience Questionnaire, devised to assess student effort in 14 different arenas of college life, (Pace, 1984) has demonstrated the validity of student effort as an influential variable that has not previously been included in higher education research.

The 14 scales of the CSEQ can be grouped into three clusters, some of which relate more directly to curriculum (conceived as an academic plan) than others: (1) quality of effort in academic and intellectual experiences, (2) quality of efforts concerned with personal and interpersonal experiences, and (3) quality of effort in relation to group facilities and opportunities. Additional scales, not falling in the clusters, concern the use of cultural facilities and use of science laboratories. Students who have highest scores on the academic/intellectual quality of effort scales are ones who typically spend forty hours or more per week on their school work. Self-growth perceived by students in areas related to the scale clusters is positively correlated with effort reports. In every case the quality of effort measure added considerable predicting power to student input measures in predicting college outcomes. Pace's prediction is that with increasing use of this measure current research summaries emphasizing relatively fixed student and institutional characteristics will be revised to the conclusion: "What counts most is not who you are or where you are but what you do."

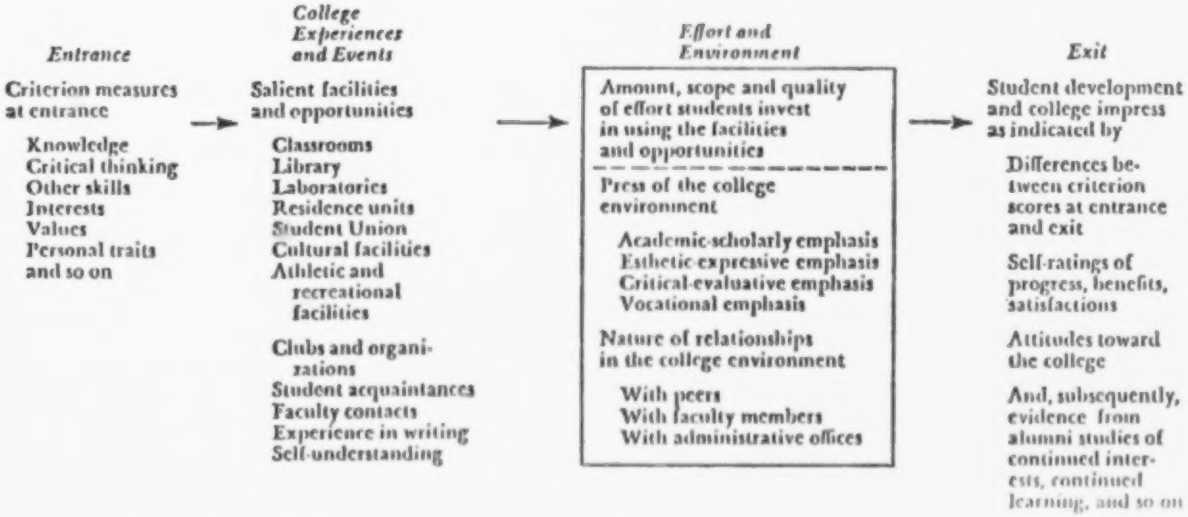

Entrance
Criterion measures at entrance
Knowledge
Critical thinking
Other skills
Interests
Values
Personal traits
and so on
College Experiences and Events
Salient facilities and opportunities
Classrooms
Library
Laboratories
Residence units
Student Union
Cultural facilities
Athletic and recreational facilities
Clubs and organizations
Student acquaintances
Faculty contacts
Experience in writing
Self-understanding
Effort and Environment
Amount, scope and quality of effort students invest in using the facilities and opportunities
Press of the college environment
Academic-scholarly emphasis
Esthetic-expressive emphasis
Critical-evaluative emphasis
Vocational emphasis
Nature of relationships in the college environment
With peers
With faculty members
With administrative offices
Exit
Student development and college impress as indicated by
Differences between criterion scores at entrance and exit
Self-ratings of progress, benefits, satisfactions
Attitudes toward the college
And, subsequently, evidence from alumni studies of continued interests, continued learning, and so on

Figure 2. Path for a student development and college impress model (C. Robert Pace).

Student Development Approaches (Cross)

If Pace's work indicates that "what counts is what you do" as a learner, the work of Cross certainly asserts that "what you do may depend on who you are."

Cross has written prolifically on educational processes designed specifically for increasing numbers of adult learners and for the "new students." New Students are those college enrollees who would be considered college material only in an age of open admissions (Cross, 1976). These are primarily first-generation college students who ranked in the lowest third of high school graduates on traditional tests of academic achievement; about 40% of them are minorities (Cross, 1976, p. 4-6). Cross' thesis is that reshaping of the curriculum is obligatory to help these students attain mastery of educational tasks and thus make progress in both cognitive and affective domains.

Cross holds out a pluralistic model of education that would help students develop their specific talents but would not insist that all become experts in every area. The three areas she views as important outcomes of college are: (1) specific knowledge (ideas); (2) interpersonal skills (people); and (3) the ability to work with objects and materials (things). Of these three development areas (ideas, people, and things), students would be required to show excellence in one area and adequacy (minimal threshold of competence) in the remaining two (p. 18). Cross developed her ideas for curricular and instructional change in a few of these areas she believed to be particularly neglected, leaving for others the task of fleshing out the remaining details (p. 20). Her main thesis is that traditional instruction must be modified to offer opportunities for mastery and the total educational experience must offer opportunities for the development of excellence in work considered valuable by society.

A second thesis put forth by Cross is that "individualization of learning lies at the heart of the instructional revolution" (p. 74) and "All methods of individualized education begin with five basic principles that are widely accepted today as essential ingredients for effective learning." (p. 52):

1. "The student must be active rather than passive."
2. "The goals of learning must be clear and must be made explicit to the student."
3. "Very closely related to the need for course objectives is the desirability of small lesson units...dealing with a single concept."
4. "Effective learning requires feedback and evaluation."
5. "Recognizing the enormous individual differences in the rate of learning" (both between individuals and for a single individual learning different types of skills), "all approaches to individualized instruction feature self-pacing" and high levels of learner control.

One possible strategy that may have merit is "mastery learning" which does not compromise standards but can provide success and satisfaction as students find themselves able, sometimes for the first time, to cope and progress academically (p. 12). Introduction of mastery learning would call for revising the curriculum as well as reshaping methods of instruction. Using her five principles, Cross necessarily would restructure college courses and their mode of delivery, at least for previously low achievers, so that learning would proceed through the use of self-paced modules, having clearly defined objectives with mastery of each occurring in the student's own time frame. Additionally, because individuals have different preferred ways of learning (cognitive styles), faculty members should be alert to the need for sensitivity to student differences in style of learning as well as pace of learning (p. 133). If implemented, Cross' ideas would change the types of curriculum elements that are low in the change hierarchy postulated by Bergquist, Gould, and Greenberg (1981) by eliminating semesters and grades (Cross, 1976, p. 77) but would also require reconsideration of curriculum elements most resistant to change, such as procedures and anticipated outcomes.

Cross holds that the dualism that views student cognitive development and student affective development separately is both erroneous and ironic (p. 139). We know a great deal about student development and the following propositions by Cross are probably acceptable to most educators:

> 1. Development is a life-long process occurring in sequences and spurts rather than in linear or regular progression.
>
> 2 Development involves the total being integrating cognitive and affective learning.
>
> 3. Development involves active internal direction rather than "adjustment" to culturally determined criteria.
>
> 4. Development is stimulated when the individual interacts with an appropriately challenging environment.
>
> 5. The phenomena of developmental growth can be submitted to scientific study.
>
> 6. Educational programs and interventions can be designed to make an impact on the rate, level, and direction of development. (p. 167)

Clearly, Cross believes that Item 6 in the list is one that deserves the immediate attention of colleges and that sufficient knowledge is at hand to proceed with massive curricular revisions.

Student Development Approaches (Chickering)

Paralleling the writings of Cross are those of Chickering, who synthesized research on college student development into a model of student identity development (1969). The thesis of this work is that:

> Concern for disciplines must yield to a concern for persons. The concern to produce specialists prepared for a complex technological society must yield to a concern for development prepared to live in a complex society of men...if persons, not products, are to be primary, then man—not materials, not systems, not nations—must become the focus of higher education. (book jacket)

Chickering developed a model of seven major dimensions of change during the college years (and shared to some extent by those who do not attend) that are intended to make the psychological concept of identity development less abstract: (1) developing competence (intellectual, interpersonal, physical and manual skills), (2) managing emotions, (3) developing autonomy, (4) establishing identity, (5) freeing interpersonal relationships, (6) finding purpose, and (7) developing integrity. He then illustrates what kinds of actions colleges could take to foster development along these dimensions and what conditions in six major aspects of the college environment can be changed to accommodate such actions.

> I aimed to reach a level (of specificity and concreteness) where connections could be made between these dimensions of student change and educational policies and practice. Some of these interrelationships are suggested for curriculum, teaching, and evaluation...(p. x)
>
> ...Colleges and universities will be educationally effective only if they...connect significantly with those concerns of central importance to their students. (p. 3)

Many of Chickering's main points are echoed in the NIE Study Report, particularly in areas believed to foster intellectual, and interpersonal competence, such as active learning, defining and solving problems, or integrating/synthesizing information, and those believed to foster autonomy. Some of the development vectors, notably establishing identity and freeing interpersonal relationships, are clearly related to emphases in the AAC and Bennett reports which, more globally, advocate learning cultural heritage or developing international understanding. Still other points, developed under "developing purpose" and "developing integrity" seem closely related to the idea of involvement in learning and to clearer expectations for students to use as yardsticks of their own growth. For example, "the purposeful student is well-motivated and working for his own satisfaction. He has the energy and determination to keep at a job. The purposeful student is willing to tackle routine or difficult jobs congruent with his purposes and is resistant to obstacles" (p. 117).

Viewing curriculum arrangements, teaching practices, and evaluational procedures as systematically linked, Chickering offered two contrary hypotheses, the second of which lays the groundwork for his discussion of desirable curricular change to foster identity development:

> HYPOTHESIS B: When choice and flexibility are offered, when direct experiences are called for, when teaching is by discussion, and when evaluation involves frequent communication concerning the substance of behavior and performance, the ability to analyze and synthesize is fostered, as are sense of competence, freeing of interpersonal relationships, and development of autonomy, identity and purpose. (p. 148)

Based on this hypothesis he characterized four types of curricular variations: the Rocket, the Cadillac, the Horse and Buggy, and the Junkyard. Each is hypothesized to have different implications for one or more major vectors of development.

Briefly, the Rocket curriculum, typically found in the large university, aims at vocational or professional preparation, transmitting information in constellations of increasingly specialized courses to learners and seldom dealing with questions beyond those outlined in the subject matter.

The Cadillac curriculum, characteristic of prestigious liberal arts colleges, aims for more generalized development of intellectual interests as well as transmission of prescribed content and raises complex social questions around which the teacher and student may interact.

The Horse and Buggy curriculum, the most traditional, requires detailed concentration on limited selections of man's best thinking, while aiming to foster increased judgmental skills, including critical thinking, analysis, synthesis, and problem solving.

The Junkyard college curriculum has few required courses, allows students great amounts of flexibility to learn both on and off campus, is largely student centered, and aims at clarification of emotions, values, purposes as well as personal fulfillment.

The important point to be noted about each of these over-generalized models is that Chickering develops his understanding of how each of them affects different aspects of student development in a different manner, enhancing some aspects and failing to enhance others. Yet, as one considers these models in relation to recommendations provided in recent national reports, the tradeoffs are seldom noted. Clearly the Junkyard curriculum and the Rocket curriculum are in current disfavor although according to Chickering's more detailed analysis, they may foster some desired characteristics. Concurrently, the currently more popular Cadillac and Horse and Buggy traditions may neglect to foster some desired growth opportunities. Even so, Chickering has indicated that the research documenting the relationships between curriculum systems and particular aspects of student development is neither abundant nor definitive.

Continuing to focus on individual differences and life cycle models of student development, Chickering (1981) argues cogently that academic planning must be based on developmental research as well as disciplinary objectives. He asked faculty members from the various disciplines to focus on the potential implications of cognitive style differences for classroom teaching in higher education. It is clear from reading the essays in this edited volume that, initially at least, the receptivity to considering student development as an integral part of curriculum design varies widely among disciplinary faculty, even those who were presumably selected for their permeability to such ideas.

Student Development Approaches (Perry)

Through observation of Harvard undergraduates as they proceeded through college in the 1950s and 1960s, William Perry (1970) derived nine positions of intellectual development connected by transition stages through which students moved from one position to another. Despite difficulties in measuring the positions, this development scheme seems to have particular appeal to college faculty members and has become an increasingly popular source of experimentation. (For bibliographies of such research, see Griffith, circa 1985.)

According to Perry's model an individual moves from perceiving the world in absolutist terms (positions 1,2,3) to making more room for diversity and recognizing the problematic nature of life (positions 4,5,6) to finding one's own place through personal commitment in a relativistic world (positions 7,8,9). In brief, development moves through sequences– from simplicity to complexity and from differentiation to integration. In Perry's scheme, the immature person perceives the world in either-or, good-bad, permitted-not permitted terms. A child or immature student looks to an outside authority– parent or teacher– for the "right" answer. Gradually he begins to discover that authorities disagree and that the values of fellow students differ from his own. In an effort to resolve the differences between equally credible people, he adopts the "everyone has a right to his own opinion" stance or a stance of temporary compliance. In attaining more advanced levels of development, the individual begins to see that he must find his own integrity, identifying the things that are important and central to his sense of self.

Most Harvard freshmen enter college at stages 3,4,and 5 and graduate in positions 6,7, and 8. (Positions 1 and 9 are extremes that are seldom observed.) Seniors are less likely than freshmen to make simple and moralistic judgments; they are more flexible and able to cope with complexity and ambiguity; and they are more autonomous and integrated with a clearer perception of identity. Although Perry's methods differ considerably from that used by survey researchers in studying student development, his definitions of the stages of development conform rather closely to the changes in college students documented by others.

The question which remains largely unanswered is: What is the connection between progression toward higher levels of intellectual development on the "Perry Scheme" and specific curricular or instructional variables. Progress toward answering this question is proceeding in a number of places around the country (See Griffith, circa 1985). Since the scheme was not originally devised as a source of curriculum change, Perry indicated some surprise at its use in this context:

> "From all that has been published, written but unpublished, in process of being written and "personally communicated," I conclude that our scheme of development can be of more practical use to educators than I first supposed....Not only did I assume a substantial gap to exist between the scheme and the actual curriculum of classroom but I also felt a deep aversion to "application" in the sense of transforming a purely descriptive formulation of students' experience into a prescriptive program intended to "get" students to develop. (Perry, 1974)

The Perry Scheme allows a mapping of student intellectual and ethical growth against relatively congruent and well-accepted objectives for liberal education. This theory may provide a basis for designing and sequencing instruction to mesh with students' levels of cognitive development (Weathersby & Tarule, 1980). Optimally, curricula could be designed to foster such development and even less than optimally, the scheme can be used to raise faculty consciousness about the developmental levels of students in their classes. With considerably further development, schemes of student development such as those developed by Chickering, Kolb, and Perry can provide fruit for more systematic research about curriculum design.

It is difficult to find similar studies that assist us in mapping the developmental stages through which faculty progress as teachers or curriculum designers. As will be pointed out in Section III at both the K-12 and college level, we have found only one or two studies relating faculty thought processes to curriculum development. The literature does contain, however, several important discussions of curricular change at the broad programmatic level.

E. Studies of Curricular Change

As noted by Conrad and Pratt (in press), there is ample literature that attempts to apply generic change principles to problems of the curriculum. One well-known book on change, dealing specifically with college curricula, is *Dynamics of Academic Reform* (Hefferlin, 1969). Hefferlin's study indicates that change in higher education seldom occurs from the inside. Rather "outsiders initiate, insiders react." The major problem in academic change is not ignorance about effective teaching and learning but difficulties in instituting changes that will lead to improvement (p. 153). Additionally, Hefferlin notes that "Academic reform consists far more in the diffusion of educational ideas from one institution to another than in the creation of new ideas" (p. 156).

Another well-known paper (Lindquist, 1974) provides a translation of the notion of linking pins from organizational theory to "opinion leaders" as change agents in higher education. In a subsequent discussion, Lindquist (1978) describes a number of change agent strategies in working with the curriculum (facilitator, collaborator, linker, rational planning authority). Regardless of the role played by the leader, Lindquist maintains that both leadership initiative and faculty involvement are necessary to bring about lasting curricular change. Change agents must show both persistence and creativity in the strategies that they use.

Stressing views that (1) the most important factor is the organization's receptivity to change and that (2) organizations and individuals naturally resist change, Nordvall (1982) provides a comprehensive review that places various models of planned academic change in perspective. In doing so, he discusses, as well, the conditions under which each model is presumed to be effective. The models include:

1. Research models
2. Development models
3. Diffusion models
4. Problem-solving models
5. Action research or organizational development models
6. Social interaction models
7. Political models
8. Linkage models
9. Adaptive development models

The research, development, and diffusion models are viewed as rational models, depending on convincing arguments often buttressed by programs of research that identify a need for change and suggest a carefully tested alternative which is then seen as a logical way to proceed. The problem-solving model originates in a felt need for change (sometimes based on an external diagnosis), a consequent willingness to change, and a conscious search by organizational members for alternative solutions. Action research is a variant of problem-solving that gathers information to diagnose the need for change. Social interaction need not be based on evidence; often exposure to innovation, persuasion, or the sense that respected others are making the change is sufficient to initiate a well-documented pattern of diffusion. Political models usually stem from conflict and, because they are based disproportionately on the needs of predominant interest groups who articulate them, often result in unstable or short-lived change. Finally, linkage and adaptive development models are syntheses of the others and may involve aspects of all of them, particularly the introduction of an idea from outside the organization and its diffusion through social interaction. Nordvall stresses that there is no comprehensive, verified theory of how change takes place; a great deal depends on the situation.

Two additional studies on curricular change are mentioned because of the particular frameworks they use to view curricular change and because they obtained diametrically opposite results that may illustrate the situation-specific nature of change in academic matters.

In observing the process of curricular change in graduate schools of business, Trinkaus and Booke (1980), building upon the work of Chin (1967), observed two primary strategies, "empirical rational" and "power coercive." To them, empirical rational means change strategies emerging logically from the collection of appropriate evidence that demonstrates the benefits of adoption, whereas power coercive strategies are those imposed on a system by persons in authority. They believed these strategies similar to those employed during change in other types of organizations. Perhaps because the changes under discussion were concerned with the mechanistic aspects of curriculum, none of the strategies the researchers observed resembled a rational process of curriculum change involving the generation of learning objectives or discussion of the interaction of such objectives with discipline structures.

Davis, Strand, Alexander, and Hussain (1982) also believed there would be value in viewing curricular change as a process instead of a product. From discussions with faculty, they report four potential stages in development of innovations: (1) consideration, (2) design and development, (3) implementation, and (4) continuation. Based on behaviors and incidents reported by faculty, different types of organizational support are important at the different stages in the change process. For example, innovator motivation was important in the early stages, innovator activities in the middle stages and organizational support in the continuation stage. In contrast with the Trinkhaus and Booke study, the two most important behavioral incidents reported, according to these authors, were developing good instructional objectives and using effective instructional techniques. The question remains open regarding in which situations faculty will discuss the substantive aspects of curriculum change and in which situations the mechanistic aspects and their associated power relationships predominate.

Nordvall (1982) lists ten steps typically used to bring about planned change that begin with establishing and stating clearly the goals and objectives to be met and conclude with evaluating the success of the plan. The ten steps can be summarized as three questions: What do you want to do? How are you going to do it? and How will you measure if you did it? (p. 26).

The Alverno College Studies

Quite possibly the most extensive example of planned substantive curricular change in higher education, and certainly the most thorough assessment of that change in the last two decades, has been at Alverno College, a small liberal arts college for women. Documentation of this change illustrates that the Alverno faculty were receptive to change and in 1976 proceeded to ask and attempt to answer the three questions eventually posed by Nordvall in 1982.

Since the early 1970s, the Alverno faculty have devoted themselves to a thorough revamping of the curriculum to attempt to achieve in all courses several broad complex abilities they believe students should possess. These are:

Communication
Analysis
Problem solving
Valuing in decision making
Social interaction
Taking responsibility for the environment
Involvement in the contemporary world
Aesthetic response

The research design to evaluate this curriculum has been extensive, involving data from 990 participants in three groups: students, alumnae, and working professionals who had not been Alverno students. Students were studied to ascertain: (1) performance within the curriculum on the college-designed ability measures; (2) perceptions of reasons for learning, the process of learning, and its value for their own lives and career goals; and (3) performance on twelve externally derived measures that describe human growth patterns. Students entering in 1976 and 1977 were tracked through graduation and another class was studied as seniors, and again two years later as alumnae.

Based on a recent article, (Mentkowski & Doherty, 1984) major findings of the studies are summarized briefly below:

1. Students can learn complex abilities. The eight major abilities are embedded in the courses and use each course's discipline content as a context. Students show consistent change and visible recognizable performance across settings and disciplines.

2. Students become self-sustaining learners. Students describe learning as a process of experiencing, reflecting, forming new concepts, and testing their judgment and abilities in action. They described (a) making relationships among abilities, (b) taking responsibility for learning, and (c) using different ways of learning.

3. Students identified curricular elements most important to their learning. One important element was experiential validation of the usefulness of learning. Other causes are instructor attention, empathy and coaching and feedback, self-assessment etc.

4. Initially, students tended to be career oriented but the value they attached to liberal education increased as this value became allied with earlier values.

5. Students changed on measures of personal growth. Two questions were asked: 1) Can we attribute changes in measures of learning, abilities, and life-span development to the curriculum? and 2) Does the mature adult need education or is experience enough? The answers were that, after controlling for pre-test characteristics, students clearly show longitudinal developmental changes on the 11 measures— those devised by Kohlberg, Loevinger, Perry, Piaget, Rest, Kolb, Watson and Glaser, and Winter, McClelland, and Stewart. Students appear to change more in the first two years. There may be a college atmosphere effect. Older adults also changed in spite of some initial advantages as reflected in cognitive developmental scores of entering students.

6. Changes included broad generic abilities measured by McBer's Cognitive Competence Assessment Battery (Winter, McClelland, & Stewart, 1981). Changes were noted in achievement and leadership motivation, self-definition, and personal maturity.

7. Based on Kolb's measures, student learning styles changed dramatically. Students moved from using concrete thinking more than abstract and from using reflective observing more than active experimenting toward a more balanced position combining these styles.

8. Students developed moral sophistication. They became more sophisticated in the use of principled reasoning as measured by Rest's Defining Issues Test.

9. Both older and younger students changed their ways of thinking. As measured by Knefelkamp and Widick's Measure of Intellectual Development (The "Perry Scheme"), intellectual development does not occur in a linear fashion.

10. Alumnae stressed the importance of both intellectual and interpersonal abilities at work, as did other practicing professionals.

11. Abilities function as an organizing principle for role performance and career satisfaction.

12. Alumnae continue as self-sustaining learners.

13. Alumnae experienced a sense of competence.

Despite attempts to institute careful controls, one of the problems in interpreting the Alverno studies, is that it is difficult to say whether a change in the total college climate, the specific curricular changes, or the institutionalization of testing procedures that engage the student in observing and enhancing her own learning (or some combination) are the most likely causative agent.

Winter, McClelland, and Stewart's Research on Liberal Arts Outcomes

Alverno College, whose outcomes are described above, was one of the colleges (given fictional names) in a study by Winter, McClelland, and Stewart (1982). After reviewing research concerned with college outcomes, these researchers recognized the need to study liberal arts curricula, specifically with reference to their claims for teaching students to acquire behaviors associated with operating on and using information. It was their thesis that "the most fruitful measures of the distinctive effects of liberal arts education are likely to be operant measures" (p. 24), rather than traditional knowledge measures such as facts, concepts, and principles. Some of the tests, described as measures of liberal arts competence (1982, p. 208) were mentioned previously. Besides Alverno, which was known as "Clare College," several other institutions were studied and results compared with specific college missions and characteristics. The researchers found convergence between the goals colleges choose to emphasize and freshman-to-senior differences in the operant measures. Although the authors believe their work contributes some evidence to support the impact of liberal arts study on students, they are cautious in their results: "We are not completely certain how much they have to do with the liberal arts curriculum as such or with any particular aspect of the form and content of the curriculum" (p. 182). They do however, make claims for the measures which they used and which are available for other institutions to purchase. (Costs are described in an appendix to the book). Specifically, they claim:

1. "A measure of liberal arts competence should seem to measure what it purports to measure; that is, it should have face validity." (p. 184)

2. "A measure of liberal arts competence should be generic, applicable to different levels and across fields." (p. 185)

3. "A measure of liberal arts competence should be based on criteria that are public; so different evaluators would make approximately the same assessment of the same student performance." (pp. 185-86)

4. "A measure of liberal arts competence should have educational validity." (p. 186)

5. "A measure of liberal arts competence should be demonstrably relevant to performance in later life." (p. 187)

The Immediate Future

Despite the fact that like other reviewers (Conrad & Pratt, 1986; Wood & Davis, 1978) we have found a scarcity of research studies dealing with curriculum design or relating outcome measures to specific elements of academic plans, such studies may abound within a few years. It appears that the mix of institutional receptivity and external influences is right for several of the models of change described by Nordvall.

First, a problem-solving model results from the diagnosis of curricular deficiencies made by three national reports, leading faculty to seek alternatives. The diagnosis has been reinforced as members of the NIE Study Group have traveled from campus to campus serving as linkage agents and opinion leaders. Indeed, part of their message is one of social interaction since they frequently report that other campuses are pursuing change based on the recommendations of the reports. Several campuses that have attempted to measure student educational outcomes and to use the knowledge gained in curricular revision serve as early adopters in a standard diffusion model. It probably would be less correct to assume that these local efforts represent a research model where the derived information leads to rational decision-making. Finally, elements of a power-coercive model of change are present. Specifically, there is substantial movement in various states and university systems to mandate skills and achievement testing for the purpose of student entrance, course placement, academic progression, and assessment.

To illustrate this public external impetus to change, the Southern Regional Education Board *Access to Quality Undergraduate Education* (1985) takes the point of view that improvement of higher education quality requires action by state leaders as well as by campus leaders. This position is based on data that indicates entering college students are substantially deficient in basic skills and must have remedial education. Additionally, the panel believes that much supposedly college level work is not, in fact, of collegiate quality. They urge states to establish statewide standards for placement in collegiate courses creditable toward a college degree and to establish clear new standards for progress and for awarding the degree.

Mingle (1985) reviews some related initiatives, the highlights of which follow:

> The Southern Association of Colleges and Schools is requiring member institutions to evaluate student learning systematically by measuring appropriate outcomes of the educational process.
>
> The Tennessee Higher Education Commission has devised an explicit statewide instructional evaluation program offering financial incentives to institutions for program evaluation. Accordingly, Tennessee Technological University administered the ACT-COMP exam to evaluate general education skills of college seniors and compared achievement to predicted scores. This same institution used the ETS undergraduate test in business, the National Teachers Examination, and Alumni surveys in its self-evaluation.
>
> The State of Georgia has instituted tests in the teaching and nursing fields.
>
> Since 1977, New Jersey has administered a Basic Skills Assessment Program, developed by Educational Testing Service, to evaluate all first-time college students. The test consists of an essay and tests of reading comprehension, sentence sense, computation, and elementary algebra.
>
> The State of Ohio has administered a voluntary testing program to high school juniors in 600 high schools, linked with advice from state universities on placement and curriculum improvement at the high school level. As a result, the entering college freshmen are reported to have higher math abilities.
>
> Mississippi requires the ACT-COMP for students seeking admission to teacher education programs at the end of the sophomore year of college.
>
> "Rising junior" exams requiring minimum competency for advancement to upper-division college programs have been instituted in Georgia and Florida. This examination in Florida (CLAST) is used in conjunction with transfer from junior to senior colleges.

Most of these initiatives are not, at the start, linked with curriculum changes, and if improvements are seen, causative factors will be difficult to ascertain. In some cases, as in Florida, nearly simultaneous introduction of new entry requirements to community colleges, the rising junior exams to enter a senior level institution and the "Gordon Rule" requiring all students to complete 12 semester hours of English coursework including written work of at least 6000 words, and introduction of non-credit remedial education requirements for students with identified deficiencies, will preclude identification of whether curriculum change or test requirements had greater impact on student success.

Until recently, a serious obstacle to researchers seeking to assess the impact of potentially alterable variables in the college curriculum that might produce changes in student outcomes has been the absence of comparable college level outcome or progression tests. Institutions have been reluctant to pay high testing costs, to risk legal actions by forcing students to take tests, or to evaluate faculty on the basis of test results. Even researchers who have found institutions otherwise cooperative in studies often have depended on volunteer or captive samples or have needed outside funds to pay student test takers. As a result of the current emphasis on student assessment and its potential use as a mechanism for teaching improvement, the climate for research on curricular issues seems likely to be more favorable. Mingle (1985) also reports active efforts among major test developers, perhaps counteracting difficulties they have experienced in response to accusations of cultural bias. ETS, ACT, NCES, and NAEP are all likely to produce new college outcome measures shortly. On the other hand, if many curricular changes occur while the tests are being developed, the variables may be difficult to separate and we may proceed with seemingly rational but erroneous bases for curricular change. The literature relating testing and curricula in higher education is in a developmental stage and is beyond the scope of this review. We expect to see improved understanding of the relationship over the next few years.

New approaches to these issues are on the horizon with the issuance of two May 1986 Requests for Proposal (RFP) by the U.S. Department of Education, Office of Educational Research and Improvement. One RFP, entitled "The Effects of Differential Coursework on Student Learning in College" asks researchers to conduct a study comparing the patterns of courses taken by students in at least four types of institutions with improvement of senior students' "general learned abilities." General learned abilities are broadly defined as abilities as such communication beyond basic literacy), analytic reasoning, problem solving, etc. The Graduate Record Examination (verbal, quantitative, and analytical tests) is suggested as the value-added outcome measure preferred, although presumably researchers may defend the use of alternate measures.

In describing the background research for the proposed study, the RFP states that of the sizeable numbers of studies completed, "none of them accounts for the most basic student experience of higher education: the curriculum."

The proposed complementary study, for which an RFP has also been issued, is to develop models for undergraduate learning in various major academic disciplines and fields. Bidders are asked to describe how one would construct indicators of undergraduate learning in that field and to build a model for such indicators. The purpose of the project is to move beyond data collection on degrees granted to assess what is learned. This proposed study appears to fill a logical gap in understanding the potential effects of the curricular plan on teaching and learning.

From our point of view in this literature review, one of the most interesting statements in these RFPs is that prior studies "have not probed beneath the surface of titles or broader curricular classifications to identify the knowledge paradigms inherent in differential coursework." The researchers who undertake the transcript studies are asked, within the first year, "to identify the cognitive structures and processes common" to the different course-taking patterns. This task is an important one and such an analysis has not surfaced in our review of literature relating to curriculum.

F. Summary

Beyond reports of histories, case studies, and trend reports, literature on college curriculum seems to fall into two primary categories which might be likened to an architectural blueprint and a computer program. Those who have the blueprint for a quality education know what the product should look like but are not always able to articulate what construction processes would achieve it. Those who prefer a computer program have a plan for getting to the product but, because so many variables may be entered into the program, the product is not clearly specified. Neither group has indicated how the product can be recognized nor designed a fully acceptable way of observing and assessing the process.

Several national reports have made such terms as "coherence," "integrity," and "integration" the curricular watchwords of the 1980s. Yet, when viewed from the perspective of the curriculum as an academic plan, the reports themselves do not exhibit the qualities of logical, harmonious wholeness implied by these words. Rather, as is the case in related background literature, the reports primarily emphasize either product or process, leaving higher education with a continuing sense of confusion and fragmentation rather than clear mandate for change.

Consistently, however, throughout the major writings, including the national reports, certain sets of variables surface. One set of variables is the characteristics of the disciplines, always considered important but seldom examined in detail. Another set of variables, usually envisioned as falling on an axis at some angle to disciplinary characteristics, is a set of general learned capabilities that are rather uniformly believed to be important. The matrix formed by these two sets consists of an uncertain number of cells and there is little empirical evidence about the interaction that each cell represents. To these two primary dimensions, the literature adds at least two more sets of variables, namely (1) theories of student development that may interact with the disciplines and are believed related to the acquisition of the learned abilities, and (2) a set of student experiences generally assumed (but seldom demonstrated) to produce the learned abilities. The result is an n-dimensional matrix (at least four dimensions, perhaps more), which has clearly presented a complex puzzle for researchers.

The puzzle may remain unsolved, however, not only because of its complexity but because curriculum development in higher education has typically been the autonomous province of disciplinary specialists. Except in psychology and education courses, seldom have generalist researchers interested in these relationships been able to gain entrance to classes in other disciplines. The current receptivity to change, as well as the models provided by such institutions as Alverno College and Northeast Missouri State University, may assist in developing fruitful collaboration of discipline experts and higher education researchers.

In particular, there is a paucity of research and little published discussion of the relationships specified in the core of Figure 1 (in which we defined the boundaries of the literature). We have found no studies that examined the interaction of discipline structures and intended learning outcomes or studies that attempted to determine how these factors interact with other relevant variables to structure course and program plans.

Some incomplete but promising models exist in the work of Dressel, Bergquist, and Toombs. Dressel's writings are suggestive but will be pursued only when hundreds of variables can be specified more fully. As presently formulated, Bergquist's categorizations do not help us to understand the process through which the nontraditional curricular plans he examined were constructed or whether the categories are also applicable to more traditional courses and programs. In describing design involving content, context, and form, Toombs has presented an enticing scheme but one that has not yet been the subject of further exploration or experimentation. The Alverno studies present a model worthy of emulation but one requiring a higher level of institutional commitment than most colleges are willing to make. Faculty may perceive studies about level of student effort to be less threatening than studies which seem to place total responsibility for success on teachers. Thus, Pace's concept of student effort introduces an important variable to provide greater access to the classroom as a curriculum laboratory.

We have been particularly selective in our review, discarding many redundant discussions in favor of highlighting various representative and widely respected views. The redundancy itself indicates the undeveloped state of the literature on the college curriculum and its design. Seldom in our search of the literature did we encounter a new conception, a shift in approach, or an encompassing vision of the relation of learning plans, learning experiences, and learning outcomes.

II. Summary of Pre-College Curriculum Literature

Literature on curricula, including both theory and empirical studies, is far more abundant at the pre-college level than at the college level. Two factors may account for this: (1) there is greater centralization of curriculum planning responsibility, and (2) disciplines are taught at a level sufficiently general to allow wider discussion of concepts and structure. In this review we do not attempt to cover the many specific studies of curricular change in elementary and secondary education. Rather we focus on several broad areas of curriculum literature that may provide useful notions and frameworks in studying the design of college curriculum conceived as a comprehensive academic plan. Although of necessity we have had to pick and choose, to the best of our knowledge the K-12 curriculum literature has not been examined from this vantage point. Thus, our summary is very selective, drawing on literature we believe may contribute to understanding college curricula.

The broad areas covered in the review include: (1) definitions of curriculum; (2) the nature of the activity called curriculum development or planning; (3) varied theoretical assumptions from which curriculum planning proceeds; (4) approaches to curriculum development; (5) organizing frameworks for structuring and sequencing curricula; and (6) selected related developments in instructional psychology.

A. Definitions of Curriculum

The pre-college literature about curriculum is characterized by a wide range of definitions for the concept. Indeed, this definitional issue has fostered vigorous discussion (Beauchamp, 1982; M. Johnson, 1967; Posner, 1973; Walker, 1980). In contrast to higher education where the term is used with the (untested) assumption that it constitutes a shared language (Conrad & Pratt, 1986), pre-college educators have actively attempted to develop working definitions. A striking characteristic of these definitions, however, is their diversity. Consider, for example, the following:

> "A sequence of potential experiences is set up in the school for the purpose of disciplining children and youth in group ways of thinking and acting. This set of experiences is referred to as the curriculum" (Smith, Stanley and Shores, 1957).
>
> "All the experiences the learner has under the guidance of the school" (Foshay, 1969).
>
> "A plan for learning" (Taba, 1962).
>
> "The curriculum...can be conceived of as a series of planned events that are intended to have educational consequences" (Eisner, 1979).
>
> The planned and guided learning experiences and intended learning outcomes, formulated through the systematic reconstruction of knowledge and experiences, under the auspices of the school, for the learner's continuous and willful growth in personal-social competence" (Tanner & Tanner, 1980).
>
> "The term will refer to decisions about the educational experiences of students; a curriculum is a set of decisions about what outcomes are desired for students or a result of such experiences, and the instructional activities likely to facilitate the achievement of these outcomes" (Leithwood, 1985).
>
> "A structured series of intended learning outcomes" (M. Johnson, 1967).

In an attempt to codify the range of definitions, Schubert (1986) has categorized the major conceptions of curricula as:

Content or subject matter

A program of planned activities

Intended learning outcomes

Cultural reproduction

Experience

Discrete tasks and concepts

An agenda for social reconstruction

"Currere" (interpretation of lived experiences)

From this array and categorization we conclude with others (e.g., Walker, 1980): (1) there is no widely accepted definition of curriculum in the K-12 setting, and (2) the definition often flows from the concept in use by curriculum developers. In a recent review article Connelly and Lantz (1985) have concluded that the various conceptions provide different bases for thinking about the nature of curriculum development, research, and practice. M. Johnson (1967) claims that "educational researchers have traditionally been more concerned with improving education than with understanding it," therefore many definitions have a pragmatic tone.

B. Nature of Curriculum Development or Planning

Literature on public school curriculum development falls into several categories, including (1) nature of the curriculum, (2) research concerning the curriculum, (3) curriculum development, and (4) curriculum management and organization. The last of these literatures, curriculum management and organization, entails administrative concepts fairly specific to the public school setting and will not be reviewed here. The first three are discussed briefly below.

Discourse on the Nature of the Curriculum

Discussions about the nature of the curriculum are referred to by those in the field as the "primary" literature of curriculum (Walker, 1980). Although the literature might legitimately focus on the derivation of content from societal needs (Hurd, 1983), it frequently addresses perceived deficiencies in schools, their curricula, and potential solutions (as exemplified by the 1983 NIE report, *A Nation at Risk*). According to Walker, it is characterized by calls to action, exhortations, persuasions, and urgings, but little empirical research. In this sense, the discussions about the nature of the curriculum in public schools parallel those sets of literature in higher education that are persuasive, rhetorical, and normative rather than research-based (see Figure 1, Ovals 1 and 2). The discussions focus either on very general curriculum considerations or on the essentiality of specific content areas. From the perspective of some, this body of literature cannot be considered serious professional inquiry (Walker, 1980).

Connelly and Lantz (1985) propose broad guides to studying curriculum literature. Their classification steps, may be considered roughly parallel to those followed by Conrad and Pratt (in press) in reviewing similar literature on college academic programs.

1. Classify the paper or speech according to the primary curriculum topic.
2. Identify whether the paper discusses general curriculum considerations or more specific subject concerns.
3. Determine the author's point of view. Is the author writing from a perspective of social science foundation fields? From subject matter field? From personal experience?
4. Determine if the work is practically oriented or oriented toward theory and knowledge.

Literature on Curriculum Research

Much literature on curriculum research at the pre-college level attempts to show that one plan of organizing subject material to be taught is superior to another plan in some respect. Walker and Schaffarzick (1974) provide a detailed review of the methodologies frequently used in such studies and explain some of the difficulties with which the research is fraught.

Their review parallels Pascarella's (1985a) on the results and methodological concerns of outcome measurement in the college curriculum. An important distinction is that in public school studies the treatment variable is usually fairly clear (an alternative presentation of material or a revision of intended learning outcomes) whereas in higher education few such experimental studies are reported, at least in the general literature. Even at the K-12 school level, however, there is concern that the degree of implementation of new curricula often is not adequately ascertained to merit conclusions about its effects (Fullan & Pomfret, 1977).

Literature on Curriculum Development

A large and significant amount of literature about curriculum development at the K-12 level is available for review and scholarly attention. The diversity implied in the curriculum definitions given earlier is, at least for some scholars, a disturbing characteristic of the literature since it reflects differences not only in approaches but in the criteria or procedures used as a basis for developmental activity. Consequently, to facilitate both comprehension and use of the ideas, scholars have attempted to classify these approaches, some of which are viewed as theories of curriculum development (e.g., Tyler, 1950; Taba, 1962; Gagne, 1965; Phenix, 1964). This is an active field where, as Connelly and Lantz (1985) put it, "new additions are common" (p. 95). The next section offers an overview of some recent schemes for classifying theories and sets of assumptions about curriculum that may be useful in higher education.

C. Theoretical Assumptions for Curriculum Planning

In this section, we will consider the organizing schemes proposed by Posner (1985), Huenecke (1982), Vallance (1985), and Gay (1980).

Posner (1985) offers the following classification of the curriculum development literature: (1) means-end approaches (Tyler rationale, (1950) Taba, 1962; Goodlad & Associates, 1979; Posner, 1981); (2) naturalistic approaches (Schwab, 1969; Walker, 1971; Clark & Yinger, 1979); (3) epistemological approaches (Schwab, 1964; Phenix, 1964; Confrey, 1981; Broudy, Smith, & Burnett, 1964; King & Brownell, 1966); 4) analysis of experience approach (Huebner, 1966; Pinar, 1974); and (5) preconceptions approach (Posner & Rudnitsky, 1982).

Each of these categories probably has a correlate in the higher education literature. Most obvious, however, is the relationship between the writings by Dressel and those of pre-college theorists who espouse the epistemological approach.

Using an approach similar to Dressel's analysis, King and Brownell (1966) have developed a curriculum theory model based on organization of the disciplines. For them a discipline has the following characteristics, which are reminiscent of those set forth by Dressel and Marcus: (1) a community of persons, (2) an expression of human imagination, (3) a domain, (4) a tradition, (5) a syntactical structure— a mode of inquiry, (6) a conceptual structure— a substance, (7) a specialized language or other system of symbols, (8) a heritage of literature and artifacts and a network of communications, (9) a valuative and affective stance, and (10) an instructive community.

Providing a less obvious parallel but one closely related to current thought in higher education is the "preconceptions approach" drawing from cognitive psychology. According to Posner (1985),

> Knowledge of what students know or believe, methodologies for probing students' cognitive structure (such as the clinical interview), and curricular and instructional strategies for effective conceptual change constitute a relatively recent but growing area of curriculum knowledge. (p. 1226)

Huenecke (1982) classifies curriculum theories into three categories: (1) structural, (2) substantive, and (3) generic. In Huenecke's terms, structural theorizing is represented by the writings of Tyler (1950), Goodlad and Associates (1966), Beauchamp (1981, 1982), M. Johnson (1967), and Taba (1962). As the category name implies, structural theorizing concerns the structures of curriculum elements, structure of planning, and related systems constructs in examining the relation between curriculum and instruction. The best known prototype is the "Tyler rationale" of curriculum planning. This prototype emphasizes the use of goals and objectives to explicate purpose and direction for instruction, to specify teaching and learning activities in an organized course design and to delineate outcome measures for evaluation of student achievement. According to this model, sources for curriculum decisions should be the student, the society, and the accumulated knowledge of the times. The underlying assumption of this approach is that educational practice is (or can be) a science. In higher education, the proposals of Toombs (1977-78) and Diamond et al. (1975) could be said to follow the Tyler rationale, which considers curriculum as a design problem.

Generic theorizing builds on the works of Huebner (1966), Apple (1975), and MacDonald (1981). Unlike the structural approach, generic theorizing focuses on the cumulative effects that education has on the whole person. Rather than discussing goals, learning processes, feedback and outcomes, the generic viewpoint stresses humaneness, consciousness, liberation, integration, and diversity of experience. Language is considered a reflection of thought; much learning is unintended learning and planning should not be over-emphasized. Proponents of this view probably view education as more of an art than a science. In higher education the writings of Gamson and Associates (1984) and W. B. Martin (1982) exemplify this approach.

Substantive theorists decry the failure of relevance, failure to foster excellence, and failure to educate the total person in contemporary schools. The approach highlights subject matter or content but admits a problem-centered approach with integration across disciplines. These theorizers include Stratmeyer et al. (1957), Phenix (1964), Eisner (1979), Fantini and Weinstein (1968), and Berman (1968). The higher education theorists falling in this category may include Chickering, Dressel, Halliburton, and Bergquist.

Vallance (1985) describes four systems of curricular thought in a slightly different way and extends her work to include a fifth system based on ways of knowing. The four classifications she describes include:

1. A focus on "how to construct" a curriculum, illustrated by the Tyler rationale which prescribes a series of sequenced steps in curriculum development.

2. A focus on "where to construct a curriculum," illustrated by Schwab's conception of the four commonplaces (teacher, student, subject matter, and milieu), which emphasizes that a decision about one of the four elements will affect the other three.

3. A focus on conflicting concerns that must be dealt with in curriculum development (Eisner & Vallance, 1974). The five areas of concern include: (a) development of cognitive processes, (b) self-actualization of the learner, (c) social changes and relevance to student and national life, (d) academic rationalist conceptions of the importance of Western cultural traditions, and (e) a focus on the efficient management of learning exemplified in a view of curriculum as technology.

4. A focus on curricular language and classroom meaning (Huebner, 1966) that uses the following perspectives to comprehend educational activity: technical, practical, scientific, aesthetic, and ethical.

In the same way that we independently categorized higher education literature as predominantly concerned with "product" or "process," Vallance posits as a fifth system that the four systems described above can be classified along two dimensions: (1) "process-oriented systems of curriculum planning" and (2) "normative commitment schemes." She believes that new notions of the "ways of knowing" provide new and different sets of questions to ask that challenge the assumptions in these other schemes.

A classification by Geneva Gay (1980) closely parallels the Eisner and Vallance (1974) conflicting- conceptions scheme, classifying models of the curriculum-planning process as (1) the academic model, (2) the experiential model, (3) the technical model and (4) the pragmatic model. Gay stresses that these are not pure categories that exist in any real world setting; indeed elements of all may be found in any given curriculum. They may, however, represent sets of assumptions that faculty members at all levels bring to their planning, perhaps based on their own education and experience. It is interesting to note that teaching patterns described as innovations in higher education commonly embrace one or another of these conceptions. Examples would be colleges or programs that lean heavily on experiential learning or those that adopt a technical model such as the Keller Plan. The conflicting conceptions idea is reminiscent of the "trade-offs" implicit in Chickering's (1969) consideration of the contributions of various curricular patterns to seven aspects of student development.

These synthesizers (and others) have attempted to codify the corpus of curriculum development knowledge and thought. For practitioners, however, the dilemmas may be focused less on purpose and process than on implementation. What procedures will most effectively accomplish the design task? Who should be involved and at what organizational level of the organization?

D. Approaches to Curriculum Development

Short (1983), Confrey (1981), and Leithwood (1983), among others, have confronted the problems of policy making and curriculum development as those of implementing strategies. Among K-12 planners, confusion about the strategy in use frequently serves to inhibit progress in curriculum improvement.

The Balance of Participation

Short (1983) draws a useful distinction between curriculum policy-making and curriculum development. Curriculum policy-making is the process of making determinations about the kind, structure, and intent of the curriculum to be developed. Thus, issues of mission, prescription, time, and credit hours are policy issues. In contrast, curriculum development is viewed as the process "of translating policy statements into an educational program, more a technical process than a governing or controlling activity" (p. 44). Short suggests that different forms of curriculum development can be further contrasted in terms of three key variables:

1. *Where* evidence is collected, consensus is established, and consequences are projected (the *seat* of curriculum development);
2. *Who* the participants are and what qualifications they possess (the expertise required); and
3. How much attention is paid to the *realities* of the intended use-setting for which the curriculum is developed (the *teachers' role*) in the process. (p. 45)

Short then further defines each of these key variables:

1. Development Setting

Curriculum development can occur under the direction of the local educational authorities. Thus it is specific to the setting where it will be used. Alternatively, curriculum can be developed externally to use sites and have potential for a broad user constituency. Such development might occur under the direction of some external agency with no jurisdiction over where the product is to be used.

2. Expertise Required

A second key variable in curriculum development, according to Short, is the expertise required for the activity. Building on Schwab's (1973) elucidation of curriculum expertise (subject matter specialists, experts on student educational potential, "milieu" experts, those familiar with teachers and teaching practices, and curriculum development specialists). He identifies four patterns or combinations of expertise frequently found in the development process:

Domination by scholars

Domination by curriculum-specialists

Domination by milieu-experts (special group needs, the handicapped, ethnic groups, etc.)

Balance of various types of expertise.

Short suggests there may be a deliberately designed balance of power among the constituents or the process may be structured so as to give key roles to those in selected expert groups.

3. Realities of the Use Setting

The extent to which the realities of the teaching/learning environment are taken into account by curriculum developers is Short's third key variable. In higher education, such factors might include student variables (age, ability, interests, goals, prior knowledge, cognitive capabilities); faculty variables (content preparation, goals, flexibility, motivation); organizational variables (cost, time, reward systems, climate, mission); and so on. The extent to which such factors will be considered in curriculum policy making and development depends on how the participants see the product being used in the setting. Short identifies three possible use conceptions:

Implementation as directed; that is, the product is to be used as prescribed by the developers regardless of setting factors (the so-called teacher-proof curriculum). Critical local factors may or may not have been taken into account and local modification may be difficult.

Limited adaptation of the curriculum to the use setting, thus permitting some adjustment by teachers for local factors. Teachers play an implementation role.

Open adaptation of the curriculum where local realities dictate its use. The developers' product serves to stimulate thinking rather than to be a prescriptive device. Teachers become user-developers.

After combining the variables into a matrix (Figure 3) the variables of where curriculum is developed, who develops it, and where it is to be used, Short identifies three strategies that have been widely used in K-12 education:

Type I Strategy: Generic/Scholar-Dominated/ Implementation as Directed

Decision making is dominated by subject-matter experts with less influence by the other types of experts. A curriculum plan is produced independently of the use setting and is expected to be implemented as such. Typically, the production cycle includes development, field testing, revision, dissemination, and implementation. The curricula developed under government funding in the 1950s and 1960s illustrate this strategy. So too do the curricula in countries where education is centralized by the national government.

Type II Strategy: Generic/Milieu-Expert Dominated/ Limited Adaptation

Curriculum is developed outside the local educational agency. Yet it may be adapted with limited local modifications. In this instance the perspective of milieu experts dominates—persons knowledgeable about or advocates for various groups become the key actors: the young child, the potential drop-out, the gifted, the handicapped, minorities, or the academically deficient.

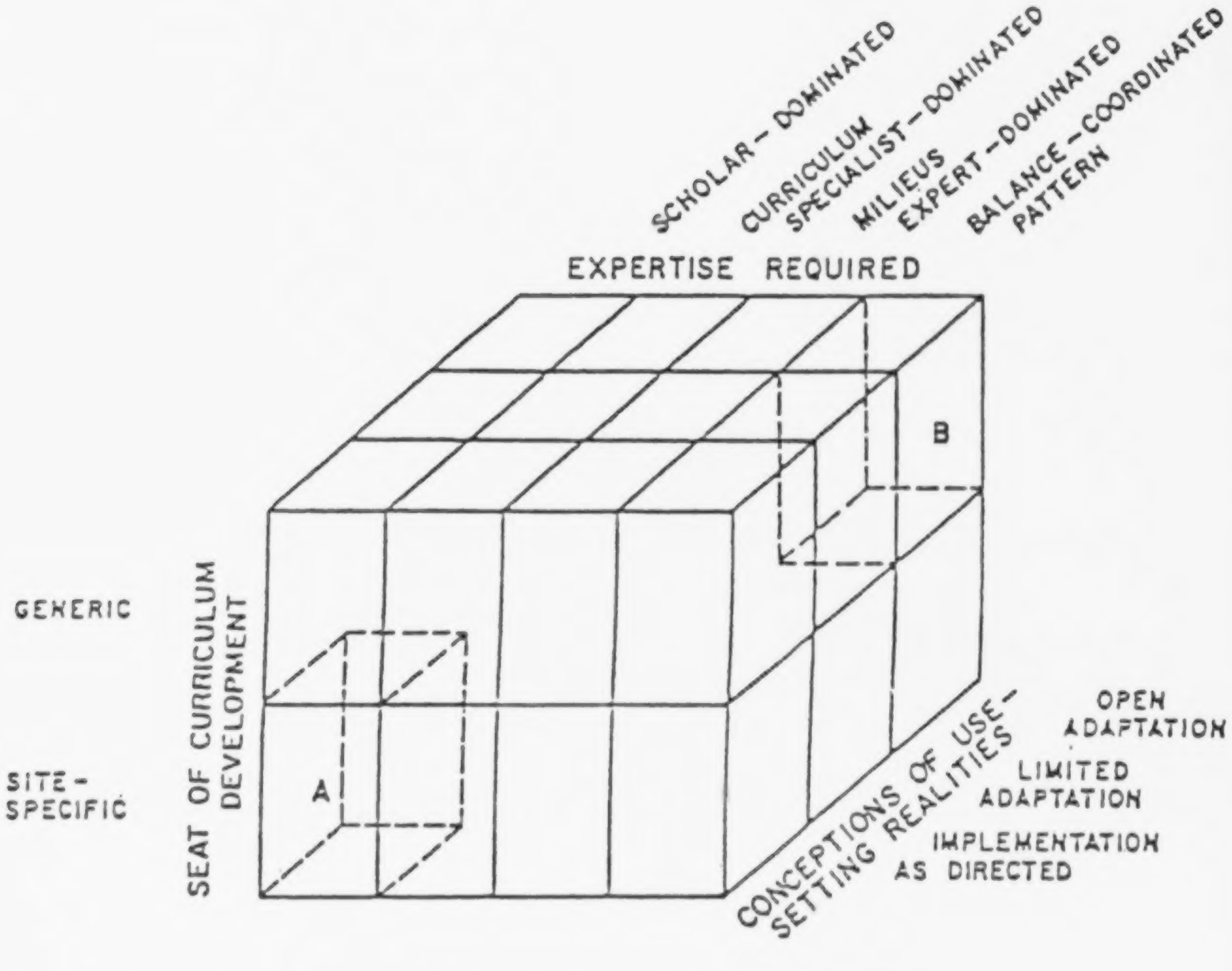

SCHOLAR-DOMINATED
CURRICULUM SPECIALIST-DOMINATED
MILIEUS EXPERT-DOMINATED
BALANCE-COORDINATED PATTERN
EXPERTISE REQUIRED
B
GENERIC
SITE-SPECIFIC
SEAT OF CURRICULUM DEVELOPMENT
A
OPEN ADAPTATION
LIMITED ADAPTATION
IMPLEMENTATION AS DIRECTED
CONCEPTIONS OF USE-SETTING REALITIES

Figure 3. Matrix for identifying curriculum development strategies (Short).

Type III Strategy: Site-Specific/Balance-Coordinated Pattern/Open Adaptation

Curriculum development occurs in the environment where the product is to be used. Those who will use it will be actively involved in its preparation to ensure that local realities are accommodated, thus teacher involvement is at its greatest.

Short draws on the work of Reid (1979) to arrive at a set of criteria for considering the employment of each of the strategies indicated in the matrix. The criteria include: (1) practicality, (2) purposiveness, (3) realism, and (4) judiciousness. In applying these criteria to the three strategies, he concludes that the Type III pattern best fulfills these criteria for an effective curriculum development strategy (p. 60). Short's conclusions closely parallel the caveats that Diamond et al. (1975) provide for the instructional developer who desires to work successfully with college faculty members in course improvement.

A Knowledge Structure Base

Confrey (1981) addresses the problem of selecting an appropriate curriculum development strategy quite different from Short's. Whereas Short constructs a scheme for contrasting development techniques across the key variables of "where," "who," and "in what context," Confrey believes that the widely advocated two-step process of curriculum development—identify content, develop ways to make it available to the learner (Huebner, 1976)—is inadequate. Embedded in these two prescriptions, Confrey claims, is an unsound assumption about the nature of knowledge that, if applied, could lead to further confusion and fragmentation of the curriculum. Assuming that the content identification process focuses on filters of purpose, value, societal, and learner needs, the developer has effectively omitted consideration of the theories of knowledge inherent in each discipline: "the failure to examine critically the various theories of knowledge inherent in each discipline has obfuscated the task of curriculum theorists and rendered much of their work inconsequential" (Confrey, p. 244).

To remedy this deficiency, Confrey advocates a curriculum development strategy primarily based on theories of knowledge implicit in the disciplines underlying the curriculum. Curriculum developers must understand the theories and determine for themselves the epistemology of their disciplines (p. 246). Thus Confrey, along with Dressel and Marcus (1982), Phenix (1964), King and Brownell (1966), and Schwab (1973), views subject matter as the basis for curriculum theory and practice.

In developing her argument Confrey uses a "conceptual change theory of knowledge" as the force driving curriculum development. This change theory is predicated on three central considerations:

1. Theories of knowledge must be identified by curriculum developers.

2. Different disciplines have different sets of characteristic theories or epistemologies.

3. Each of the theories dictates a scheme for selecting what content should be taught.

Using these core considerations, Confrey claims that conceptual change theory involves three basic tenets: (1) knowledge is not static but changes and develops over time with its meaning created by the learner through curriculum encounters using unique cognitive processes; (2) knowledge is not defined externally but develops through the work of a community of scholars who influence its values, its truth conditions and its standards of excellence; and (3) "theories influence progress and are not comparable objectively since they strive to explain different phenomena, involve different evidence and interpret that evidence differently" (p. 246).

In practice, conceptual change theory means that the curriculum developer must understand the nature of knowledge theory embedded in the subject field and must interact with learners in ways which permit them to construct and comprehend knowledge. The following statement of Confrey summarizes her argument:

> If one accepts a conceptual change theory of knowledge, then one is committed to certain basic principles in the presentation of content. These include a focus on the development of knowledge in individuals, not on the transmission of knowledge, as well as recognition that various concepts are possible among students, and in a student, over time. Also, at times, concepts change, at which point knowledge is not accumulated but reorganized, and these changes may be anticipated by consideration of the fit between subject matter and students' cognitive development. Careful subject-matter-focused attention must be combined with developmental, cognitive psychology in the task of preparing content for presentation to students. (p. 245)

Gowin (1970) has devised a series of questions to help teachers comprehend aspects of knowledge useful in deriving curriculum:

1. What is (are) the telling question(s)?
2. What are the key concepts?

3. What methods of inquiry (procedural commitments) are used?
4. What are the major knowledge claims?
5. What are the value claims? (p. 79)

The strategies advocated by Confrey and Gowin appear to include ideas common to the work of several writers in higher education. For example, Dressel and Marcus (1982), Chickering (1969), and Perry (1970) would each probably agree, in part, with these ideas.

The Dilemmas of Curricular Change

Leithwood (1983) also addresses epistemological issues by suggesting that aspects of knowledge can be labeled "procedural," implying usefulness for certain types of problems. For him, procedural knowledge refers to sets of applications skills, that is, knowing when and how to do something. For our purposes, however, in reviewing his work, we prefer the appellation "general curriculum strategies," thus avoiding confusion with a similar use of the term "procedural" in other contexts by some psychologists.

Leithwood proposes three characteristics of general curriculum strategies that should be considered in selecting appropriate techniques: (1) the types of curriculum problems the strategies can address, (2) the comparative characteristics of solutions to these problems, and (3) the relationships between problems and solutions. Leithwood's definition of curriculum (building on the work of Connelly, 1972) suggests to him the core curriculum problem:

> [It] serves to rationalize socially shared images of the educated person; those abilities, values, and attitudes and stock of knowledge considered important for an individual to possess to function effectively. It also provides means for transforming these images into actual outcomes achieved by students (1983, p. 67).

Thus the curriculum is a tool designed to achieve educational purposes. It is this challenge of transforming ends into means that presents the developer with problems and potential solutions. In this fashion, the three characteristics of general curriculum strategies are engaged: problems, solutions, and their relationships.

1. Curriculum problems

The role of curriculum as described by Leithwood presents the developer with a challenging dilemma. The curriculum must change with the growth of knowledge even when the shared image of the educated person remains constant, yet the image of the educated person also may change in response to evolving social values and aspirations. Further, the notion of socially shared images may vary as a function of the community or institution where education occurs. Curriculum development, then, is a dynamic, evolving process as a function of these three factors. General curriculum strategies must address "the gap between socially shared images of the educated person and outcomes presently achieved by students." (p. 67)

2. Solutions

Planned educational change to reduce the gap between shared images and outcomes must be orderly but must provide for student growth. Student growth, however, is the product of actions taken by others— teachers, principals, parents, and peers. Change essentially focuses on those things people can do to facilitate student growth, for example, helping to define optimal patterns of growth, identifying obstacles, and developing ways to overcome obstacles. Useful general strategies will focus on critical alterable variables that have a large influence on what is learned. Consequently, a planned change strategy must include provisions for the growth of all involved parties, not just students. Thus,the curriculum serves as a growth tool for both students and faculty.

3. Problem-Solution Relationships

For general curriculum strategies to be useful in resolving the curriculum problem described above, Leithwood suggests the solutions must possess three attributes:

> Generalizability– The strategies must be highly sophisticated and apply to many tasks in many contexts.
>
> Accessibility– It must be possible to articulate and learn the strategies so that many people can become skilled in their application.
>
> Effectiveness– The strategies must solve the problem. Strategies that include critical steps, yet are useful in many contexts are more useful than highly specific strategies.

As we indicated in a previous section, higher education historically has been strongly affected by evolving social values. Furthermore, although there frequently is a resurgence of interest in a common curriculum, it is clear that the diversity of American college missions and sponsorship results in many shared images of an educated person rather than a single conception. The ideas of Halliburton (1977), stressing changes in the nature of knowledge which require a process of orderly curricular change are, perhaps, the closest we have found in the higher education literature to those expressed by Confrey (1981) for the lower school context. Similarly, those who have analyzed change processes in higher education (e.g., Lindquist, 1978) have also stressed the desirability of viewing planned change as a process that provides growth opportunities for all constituencies. Little attention has been paid in higher education, however, to meeting the criteria of generalizability, accessibility, and effectiveness set forth by Leithwood. Curricular change strategies in higher education remain somewhat ad hoc, focusing on the lower levels of the curricular change hierarchy set forth by Bergquist et al. (1981), namely considerations of time, space, resources, and organization.

E. Frameworks for Building Curricula

One of the "structuralist" (or by his own classification, "preconceptionalist") curriculum theorists whose work has been developing in recent years is George Posner. Over the last decade his work has evolved from preliminary classifications of structural elements of curriculum to the juxtaposition of these notions with developing ideas about student cognitive structures (1973, 1974, 1978, 1980, 1981, 1985; Posner & Strike, 1976; Posner, Strike, Hewson, & Gertzog, 1982; Posner & Rudnitsky, 1982; Posner & Gertzog, 1982). Of particular interest to us are the parallels between (l) concepts of curriculum structure and concepts of cognitive structure of the learner and (2) the concepts of curricular integration and the integration of new knowledge with the learner's existing conceptual structure. This framework allows the theorist to consider, as well, integration of disciplinary concepts as they are manifested in curricular structure and as they enlighten the world of the learner, or, in Dressel's terms, organize knowledge for learning in the way that humans have organized it for study over time.

In a 1974 article, Posner considers various structures that have been proposed for the curriculum and classifies them as falling at two levels of planning. One level involves "macroelements" of curriculum, that is, those elements that represent intended outcomes of an entire program or course and that may be described in course syllabi, curriculum guides, course offerings, and program sequences. In contrast, the second level involves "microelements" of curriculum, namely those learning elements that typically characterize a course, a smaller teaching unit (several of which make up a course), or individual lessons that make up a unit. Microelements are reminiscent of behavioral objectives, whereas macroelements are more akin to program plans. Although Posner does not dwell on the locus of decision making, one can readily envision the microelements as more frequently within the decision-making province of the individual teacher whereas the macroelements are more often subject to policy discussions at a level broader than the individual classroom.

Basing his analysis on Johnson's definition of curriculum as a structured series of intended learning outcomes (M. Johnson, 1967), and attempting to create a parsimonious representation of curriculum structure, Posner classifies both macroelements and microelements along two dimensions: (l) commonality and (2) temporality.

Commonality refers to the degree to which pairs of curriculum elements are identical versus independent. The greatest degree of commonality exists when pairs of curricular elements are identical or repeated (e.g., practicing the multiplication tables). At the other end of this commonality continuum are pairs of elements that are essentially unrelated (studying Spanish grammar and geometric proofs). Between the two extremes are those pairs of elements that are neither identical nor entirely independent but are related in some way (studying English history and the same period of English literature; studying taxonomic classifications of plants and similar classifications in the animal kingdom).

Temporality refers to the relationship of curricular elements in time. If the two elements are vertically related, one element is considered subsequent to another. The treatment of the elements may be contiguous (following in direct sequence) or non-contiguous (temporally separated). If the two elements are horizontally related, they are concurrent, that is taught at the same time.

Curriculum structure, as discussed by Posner (1974, 1978, 1985; Posner & Strike, 1976) refers to relationships among curriculum elements. A curriculum in which elements (macro or micro) are organized with high commonality and are closely related horizontally would be a curriculum with high structure. In contrast, in a curriculum with low structure, curriculum elements would be vertically structured (unrelated) and have little commonality. As we will develop in a later paper, these concepts of commonality and temporality have considerable potential for a more systematic comparison of the intent and structure of various core curricula plans in higher education than has emerged thus far in the "innovative case study" approach characterized earlier in Levine's book (1978).

Posner provides a useful table of examples of variables for research into curriculum structure. The independent variables are the extent of curricular structure on each level, micro and macro levels, while the dependent variables are typical outcomes measures: (1) student recall, retention, transfer, cognitive differentiation etc., (2) student interest and satisfaction with curriculum, (3) student perception of structure, (4) student awareness of program goals and learning objectives, (5) teacher satisfaction with curriculum, (6) ease of instructional planning, (7) ease of evaluation planning.

In subsequent writings, Posner and various colleagues (1974, 1976, 1985) attempt to delineate additional relationships between curriculum elements and relationships among instructional content elements. Posner and Strike (1976) deal with the various ways in which content *can be* sequenced in the curriculum, terming this a necessary precursor to consideration of how it should be sequenced. Drawing on the content of the disciplines, "the problem of content structure can be considered a sequencing or ordering problem" (p. 666). The authors suggest the following possible sequences:

1. World-related. What are the empirically verifiable relationships between the phenomena (people, things, or events) in the world about which the pupil is to learn and in what ways can content be sequenced so that the organization is consistent with the way the world is?

2. Concept-related. What are the conceptual properties of the knowledge the pupil is to learn and in what ways can content be sequenced so that it is logically consistent in organization with the organization of the concepts?

3. Inquiry-related. How can content be sequenced so that it is consistent with the process of inquiry?

4. Learning-related. How does the pupil learn, and in what ways can the content be sequenced so that it is consistent with the learning process?

5. Utilization-related. How will the pupil use the content after he has learned it and in what ways can the content be sequenced so that it is consistent with the utilization process? (pp. 666-667)

The authors have continued to examine subtypes of these major categories of organization. (Posner, 1985).

Posner and Strike admit that there are probably few curriculum designs that are "pure" in their reliance on one of the types or subtypes as an organizing scheme. Still, it is important they believe that curriculum planners "sequence content in a particular way because the chosen sequence is the most appropriate for their purposes, not because they have never thought of any alternative sequences" (1976, p. 684).

Even in elementary education, Posner and Strike cite a paucity of research on content sequence. In their view, although the "treatments" in curricular research are described generally in most research reports, it is often not clear on what dimensions curricula differ from one another. Replicable methods are needed for characterizing experimental and control treatments in a more valid way. How content is sequenced may determine, in part, what is learned.

Posner and Strike pose a variety of research questions that their scheme may help to answer. For example,

> What kinds of content structures do different kinds of curricula (e.g., academic versus occupational) employ?
>
> Are some types of sequencing principles (e.g., Inquiry and Concept related) appropriate and typical for only certain curriculum areas (e.g., the disciplines of mathematics and science)?
>
> Are some types of sequencing principles (e.g., Utilization-related) typically found only in certain kinds of curriculum (e.g., occupational education) but are appropriate and perhaps desirable for all curriculum areas?... (p. 685)
>
> What kinds of cognitive structures and orientations are most likely to lead to the utilization of content in an individual's daily living and occupational situation? (p. 686)

F. Cognitive Psychology and Curriculum Development

This brief review of K-12 curriculum literature, selected for its potential contribution to understanding curricular issues in higher education, demonstrates the abundance of intellectual persuasions. Authors of synoptic books or textbooks in curriculum have confronted this dilemma of conceptual richness (or fragmentation as some suggest) and, as in higher education, attempts to represent the curriculum field as a coherent whole have been unsuccessful. The most successful syntheses and texts seem to be those in which the author develops a specific conceptual approach (e.g., Eisner, 1979; Schubert, 1986; Zais, 1976). Another consequence of the conceptual richness is emergence in the K-12 literature of varied classification schemes designed to provide order and manageability for students and scholars (e.g., Eisner & Vallance, 1974; Gay, 1980; Joyce & Weil, 1980). Indeed, one can easily pluck from this cornucopia a curricular approach or strategy which fits one's own intellectual or experiential inclination.

Recently, from cognitive psychology, a research theme has emerged that some scholars (e.g., Calfee, 1981; West & Pines, 1985) believe possesses strong potential for educational practice. While researchers currently are focusing their attention on the processes of learning and teaching, their findings have potential as well for curriculum development. The rapidly emerging cognitive-processing literature on teaching and learning is summarized in a companion paper in this series (McKeachie et al., 1986). Our purpose here is to describe briefly its potential for application to curriculum problems gleaned from writings of researchers whose work we have reviewed (Confrey, 1981; Posner, 1978) as well as that of other contemporary scholars whom we have not reviewed in detail (Novak, 1977; Novak & Gowin, 1984; Wittrock, 1978).

The initial research interest of cognitive psychologists is the learner-in-the-process-of-learning (West & Pines, 1985). This research is yielding new insights into learner cognitive processing, including sensory and response systems, which gradually are being applied to key classroom environment factors such as instruction and student tasks designed to facilitate content acquisition and comprehension. Cognitive psychologists theorize that learners are actively engaged in the construction of knowledge; they form knowledge structures that assist them in making meaning out of content. The role of these knowledge structures, or prior knowledge, is fundamental to acquiring new knowledge. The research base of this conclusion is primarily drawn from studies in the K-12 sector and tends to be subject specific (reading, writing, mathematics, science) rather than generic (Calfee & Drum, 1986; White & Tisher, 1986). Its application to higher education is in a very early stage of research and implementation.

Winne (1985) identifies two general principles drawn from cognitive processing research that have applicability to both instructional practice and curriculum development. The first is that cognitive processing by students can be applied to any kind of information; students can process a wide range of content in many different formats. For instructional practice this principle implies that students can use information about how to achieve educational objectives. For curriculum, the principle implies that curriculum development strategies can, perhaps, meet Leithwood's (1983) criteria of generalizability, accessibility, and effectiveness as the learner's processing mechanisms are considered in selecting and arranging content.

In short, students can be taught "learning how to learn" strategies that facilitate learning and meaning. The range of such activities is from the simple (Smith, 1982) to complex instructional strategies focusing on the cognitive memory and processing systems (Novak, 1985). Within this framework, the learner is seen to possess an elaborate conceptual ecology consisting of both a memory system (working memory, permanent memory, content, concepts, propositions, schema) and processing system (content, goals, plans, and various processes) that interact with the classroom environment. Thus, the learner has available a set of mental tools to facilitate the acquisition of meaning from curriculum. The instructional psychologist is concerned with both enhancing the power of the tools and, if necessary, expanding the repertoire. As pointed out in McKeachie et al. (1986), techniques for examining student cognitive processing are available: word association, card sorting, tree construction, cognitive mapping, clinical interviews, and so on. As suggested, the cognitive perspective has had a major impact on instructional psychology and many excellent review articles are available (Gagne & Dick, 1983; Glaser, 1982; Pintrich et. al., 1986; Resnick, 1981). At the K-12 educational level, the Association for Supervision and Curriculum Development has assumed leadership in encouraging the application of curricular and instructional strategies designed to foster the improvement of the "thinking skills" of learners.

Of even greater importance to curriculum development is the second principle (Winne, 1985), namely that "cognitive processing is neither just a response to events in a student's environment nor a complete internal determinant of a student's performance" (p. 795). Rather, learning is the product of interaction between external events in the educational environment and the students' internal cognitive processing system. In other words, successful academic functioning—the achievement of desired outcomes—results from a combination of sound cognitive functioning and appropriately chosen educational activities.

According to cognitive psychologists, then, course design or curricular revision can no longer simply be an exercise in "upgrading content" nor can teaching be merely the transmission of content from expert to novice. To facilitate meaningful knowledge acquisition, the curriculum planner must arrange the material in ways that facilitate its incorporation into the student's existing knowledge structure. Cognitivists demonstrate that knowledge is not something that is discovered by students (led to that discovery by informed teachers) but is structured or created by students through the use of cognitive processing systems (West, Fensham, & Garrad, 1985). Thus students create their own knowledge structures, which are retained in permanent memory (Winne, 1985) and "knowledge can only become meaningful for students if they themselves construct it" (Donmoyer, 1985, p. 750).

Of course, not only students create knowledge, but teachers do so as well; "the concepts, propositions and schema that make up curricula are an external representation of a part of the curriculum creator's permanent memory" (Winne, 1985, p. 803). Novak (1977, 1985) suggests that the role of the teacher in the learning process is one of mediating between the conceptual structuring of the discipline and the cognitive structure of students. To do this effectively, the teacher must be versed in the central concepts of the discipline, consciously attend to the relationship among these concepts and understand the learner's cognitive structure.

Other learning theorists whose ideas continue to be developed by research (Ausubel, 1968; Bruner, 1960, 1966; Gagne, 1965) have written extensively about issues associated with the structure of knowledge. (See Shulman, 1970, for an excellent, if dated, analysis of these theories and their application to education.) The strong potential and challenge of linking work on knowledge structure with theories of knowledge and knowledge comprehension or meaning by students is expressed in the following statement by Resnick (1981):

> First, there is a shift toward studying more and more complex forms of cognitive behavior. This means that many of the tasks and processes of interest to cognitive psychologists are ones that can form part of a school's curriculum. Psychological work on such tasks is naturally relevant to instruction. Second...is a growing interest in the role of knowledge in human behavior. Much effort is now directed at finding ways to represent the structure of knowledge and at discovering the ways in which knowledge is used in various kinds of learning.... Finally, today's assumptions about the nature of learning and thinking are interactionist. We assume that learning occurs as a result of mental constructions of the learner. These constructions respond to information and stimuli in the environment, but they do not copy or mirror them. This means that instruction must be designed not to put knowledge into learner's heads but to put learners in positions that allow them to construct well-structured knowledge. (p. 660)

In attempting to make the linkage between curriculum structure and cognitive structure, Hewson and Posner (1984) suggest that talking about content as a concept has limited utility. Rather, it is necessary to talk about disciplinary structure, which can be viewed as:

1. Generative concepts and basic principles of the discipline.
2. Powerful modes of inquiry and problem-solving strategies.
3. Organizing concepts that reduce the need to memorize information.
4. Increased meaningfulness of what is learned

It is in consideration of such structures of disciplines that the link is made between the structure of curriculum and cognitive structures discussed by psychologists. Indicating that there are few works that attempt to link cognitive science with education and none (at the time of their writing) focusing on curricular concerns, Hewson and Posner demonstrate the use of schema theory in the design of instructional materials in physics. Because the absence of a conceptual framework may account for rapid loss of information, these authors follow cognitive psychologists in proposing the concept as an organizing framework that:

1. Develops a schema to help students integrate materials.

2. Provides a means for representing and teaching the schema.

3. Functions actively as a set of expectations for students.

4. Forms a cognitive bridge linking what the student knows with some new framework.

5. Avoids students learning small unrelated bits of information and helps to build up successively larger functional units.

6. Serves as an aid in both problem-solving and understanding.

To use this disciplinary approach, because conceptual maps that relate ideas to each other depend on the relations within the subject matter (Posner & Rudnitsky, 1982), it is necessary to ask the following questions:

1. Is there a small set of fundamental conceptions that underlie knowledge in the field?
2. How might these conceptions be represented?
3. How can these fundamental conceptions be taught to the novice?
4. Is there a set of paradigmatic problems that students are expected to learn to solve?
5. Would the specification of condition-action units be helpful to students in other disciplines?

The classification scheme developed by Bergquist, Gould, and Greenberg (1981) for nontraditional interdisciplinary courses appears to be the closest conceptualization to the work of Posner and others in the cognitive aspects of curriculum that we have found in the higher education literature. Bergquist and colleagues admit that their scheme is not entirely general and contains dimensions of different orders. To our best knowledge no one has attempted to apply either of these schemes to higher education curricula in order to find answers to the questions posed by Hewson and Posner.

G. The Teacher As Curriculum Planner

Most studies of teacher behavior have focused on teachers' classroom activities during the instructional process (Clark & Peterson, 1986). Despite over a hundred years of pedagogical instruction in normal schools, colleges, and universities, in which aspiring teachers have been directed to plan instructional units and lessons, it appears that few researchers have studied teachers' actual activities as curriculum planners. Only recently, with increased emphasis on phenomenological research and its inherent attention to the meaning constructed by the research subjects have investigators turned their attention to the thinking processes of teachers as they plan and implement their work.

Because there is minimal empirical evidence about how teachers plan, authors of pedagogical texts put forth varied prescriptive models and formulas for curriculum planning without complete assurance that the planning activities or elements are arranged in a way that is meaningful and useful to teachers. Acknowledging this knowledge deficit, Posner and Rudnitsky (1982, p. 9), divide course design activities into parts—curriculum development and instructional planning—and, building on earlier work by M. Johnson (1967), set forth the model shown in Figure 4. In so doing, they admit doubts that teachers actually follow the linear planning model represented in the figure (p. 10). In fact, as indicated in the chapter references near the bottom of Figure 4, they do not follow this model as it proceeds from left to right when teaching education students to design courses. Instead they consciously ask users of the text to begin by listing ideas about content that should be covered in a course and attempting to frame these ideas as intended learning outcomes (chap. 2) before attempting to develop in detail the rationale for the outcomes (chap. 3). They then suggest that the novice planner reconsider and revise the intended outcomes in light of the rationale. Although they proceed from a linear diagram for simplicity's sake, these authors believe that curriculum planning takes place most naturally in a cyclical or spiral mode, rather than one that is linear and rational. They also imply, but do not specifically state, that the course planner has (or will obtain) sufficient knowledge of the projected course content to construct the initial list of ideas to include in the course.

In higher education it may be presumed that instructors not only are well versed in, but enthusiastic about, the principles and concepts embodied in their fields. What is not well understood is the process by which teachers at any level translate the conceptual frameworks of their disciplines to make them explicit to learners, or the extent to which extraneous ideologies, personal assumptions, and past experiences enter into the planning process.

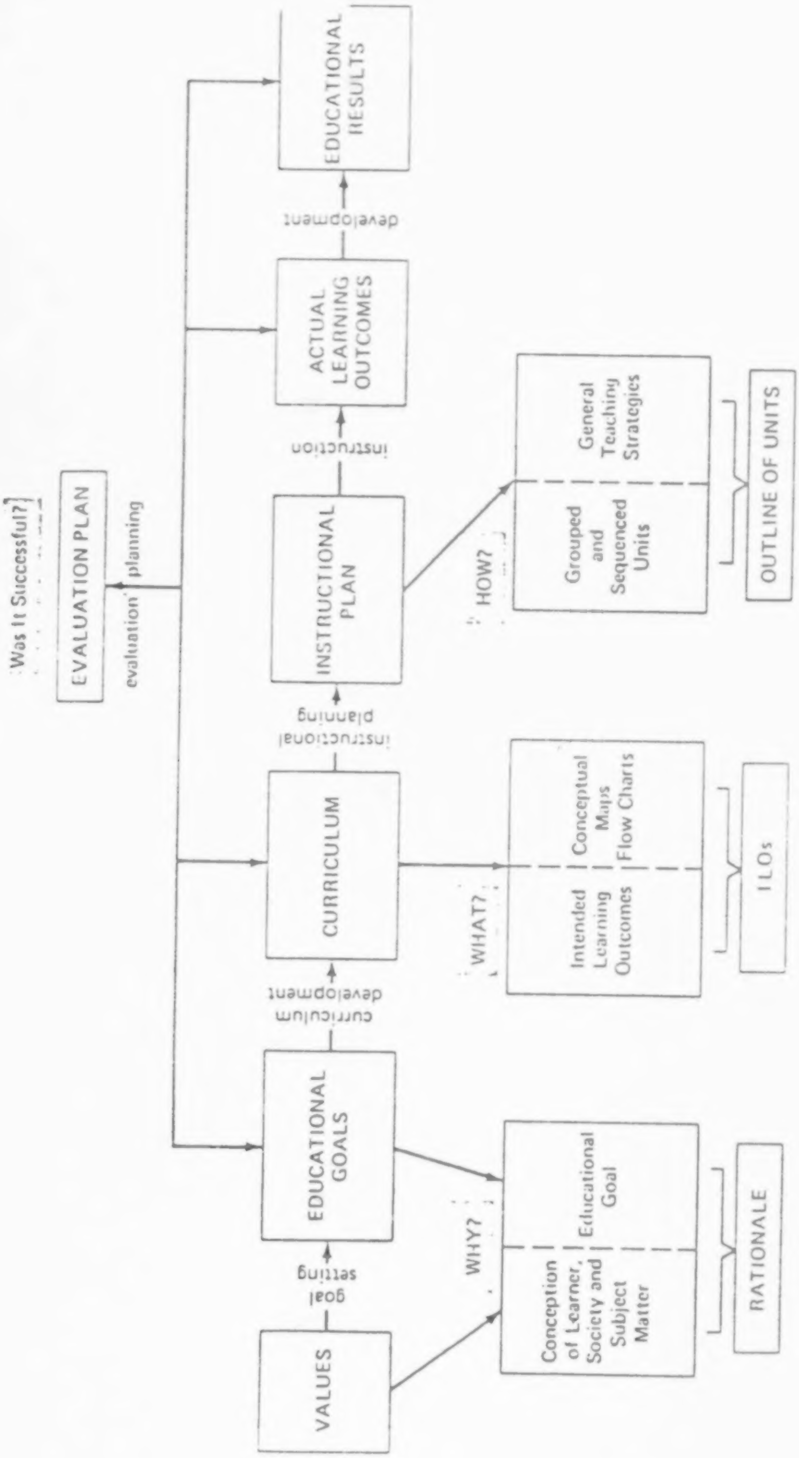

Was It Successful?
EVALUATION PLAN
evaluation planning
VALUES
goal setting
EDUCATIONAL GOALS
curriculum development
CURRICULUM
instructional planning
INSTRUCTIONAL PLAN
instruction
ACTUAL LEARNING OUTCOMES
development
EDUCATIONAL RESULTS
WHY?
Conception of Learner, Society and Subject Matter
Educational Goal
RATIONALE
WHAT?
Intended Learning Outcomes
Conceptual Maps Flow Charts
ILOs
HOW?
Grouped and Sequenced Units
General Teaching Strategies
OUTLINE OF UNITS

Figure 4. Relationship between the model of course planning and components of *Course Design* (Posner & Rudnitsky, 1982).

Posner and Rudnitsky (1982) essentially divide planning into three decision areas: (1) deciding what is to be learned; (2) developing why it is to be learned; and (3) deciding how to facilitate the learning (pp. 6-8). In this framework, they encourage the process of stating intended learning outcomes in order to: (1) guide instructional planning; (2) communicate the learning goals to important others (e.g., students, the public); and (3) provide the basis for developing indicators of success. For instructional planning, the content (what is to be learned) generally derives from an accepted body of knowledge (a discipline, disciplines, or the application of disciplines to a problem). Thus, in the view of these authors, course design that includes both instructional planning and development of success indicators may benefit from explicit conceptual maps that relate ideas to one another and flowcharts that demonstrate the hierarchical or non-hierarchical relationships of skills and concepts necessary to learning. Further, the clustering of related outcomes and concepts into "chunks" of knowledge that can readily be assimilated into the learner's cognitive schema appears to have utility (pp. 86, 88, 108).

A recent review of the growing literature on teacher thought processes before, during, and after teaching gives little indication that teachers currently spend much time in the systematic conceptual planning activities advocated by Posner and Rudnitsky (Clark & Peterson, 1986; see also an earlier review by Clark & Yinger, 1979). In contrast to teacher behaviors in the classroom, the processes of teacher planning, teacher's interactive thoughts and decisions, and teachers' theories and beliefs are not directly observable and thus are less readily measured. Thus, current notions may "reflect researchers' conceptualization of the domain of teachers' thought processes" rather than an empirically derived model. The Clark and Peterson review addresses three major questions: "(a) What are the types and functions of teacher planning? (b) What models have been used to describe the process of planning? and (c) What is the relationship between teacher planning and the teacher's subsequent actions in the classroom?" (p. 260).

Based on literature that deals primarily with planning among experienced elementary teachers, at least eight different but interdependent types of planning have been identified (Clark & Peterson, 1986). Major findings are that teachers spent a great deal of time planning classroom routines, they typically plan units rather than lessons, and they seldom write down their entire plan. Rather they appear to hold in mind comprehensive "lesson images" that encompass many of their planning assumptions. Elementary teachers appear to spend initial periods of a teaching term setting up the physical environment of the classroom, assessing student abilities, and establishing the classroom social system (Clark & Elmore, 1979). Although the task of modeling the planning processes of teachers is far from complete, the linear "rational planning model" does not describe the planning behavior of experienced teachers. Rather, the authors indicate that initial evidence indicates two interactive domains of teacher activity (Figure 5). Not only may there be a reciprocity of influence between the two domains of planning and instruction but a circular influence pattern is posited between teacher thoughts while interacting with a class and teacher theories, beliefs, and thoughts while doing pre-class planning.

Consequently, actual classroom experience may be an important factor as a teacher develops a planning style. Although experienced teachers do not appear to follow a linear planning process, training novice teachers in the linear model may help to provide them with a foundation for developing their own appropriate style. Because of the potential influence of experience, Clark and Peterson suggest that longitudinal, cognitive-developmental models of studying teacher planning may be fruitful.

While conducting their review, Clark and Peterson found only one article describing teacher planning at the college level (personal communication from Clark to Lowther, 1986). In this exploratory study, weekly interviews were conducted with a single university teacher throughout a postgraduate course in hospital administration (Powell & Shanker, 1982). Content analysis of the interviews showed that the subject faculty member spoke most about students, teaching methods and role, and the process and content of class meetings. The content of his observations and concerns varied as the course progressed and were strongly based on classroom interactions and assessment of student needs and abilities. The instructor spent relatively little time (about two hours) prior to the beginning of the course in considering content, intended outcomes or conceptual structure of the content

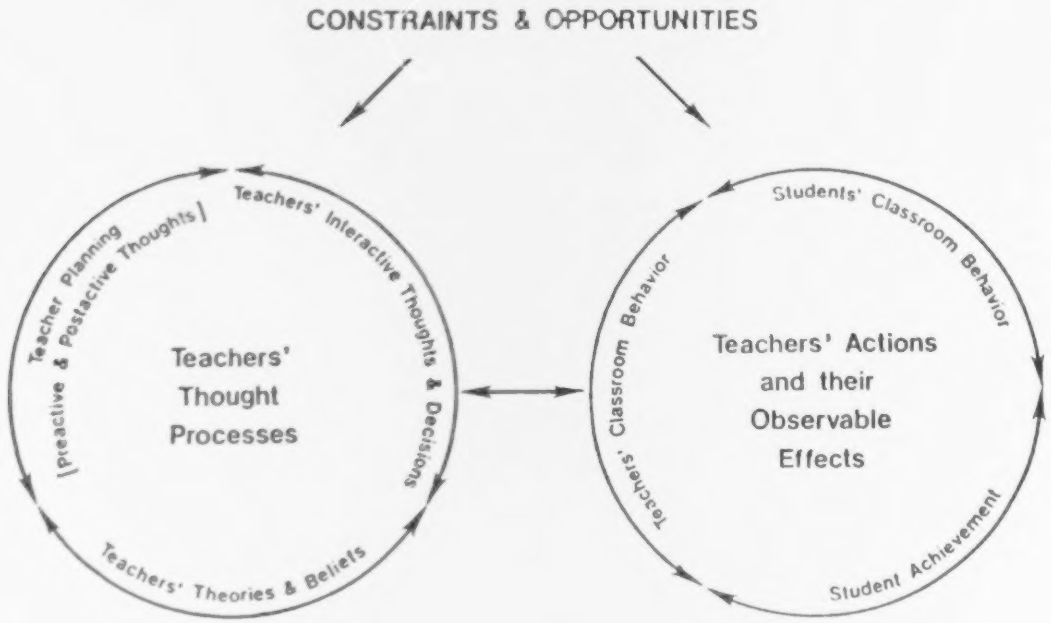

CONSTRAINTS & OPPORTUNITIES
Teachers' Thought Processes
Teacher Planning (Preactive & Postactive Thoughts)
Teachers' Interactive Thoughts & Decisions
Teachers' Theories & Beliefs
Teachers' Actions and their Observable Effects
Students' Classroom Behavior
Student Achievement
Teachers' Classroom Behavior

Figure 5. A model of teacher thought and action (Clark & Peterson, 1986).

to be taught. The results of this study seem parallel to the finding among teachers at lower educational levels that "routines" were such an important factor that teacher planning "could be characterized as decision making about the selection, organization, and sequencing of routines" (Yinger, 1979, p. 165). Powell and Shanker (1982) pose a number of questions to be answered about course planning among college instructors and conclude their paper with the following statement:

> Almost nothing is known about the ways in which academics approach and think about their teaching tasks and this ignorance constitutes a major obstacle to all attempts to improve the quality of teaching and learning. A promising start has already been made with research on school teachers and the study reported here suggests the value of extending this work into the higher education system. (p. 300)

Clark and Peterson (1986) believe a body of research on teacher planning has potential to portray the "cognitive psychology of teaching." They cite a variety of methodological issues as the most serious obstacle to such research but indicate that researchers are trying new methods of inquiry including: thinking aloud, such as when planning a lesson or making judgments about curriculum materials; stimulated recall; policy capturing; journal keeping; and the repertory grid technique. In each case the teacher whose planning processes are being studied "takes on an important role as an informant or even collaborator" (p. 260).

Posner and Gertzog (1982) discuss the utility of the clinical interview in investigations of cognitive structure and conceptual change and believe it is possible this technique, typically used in Piagetian-type studies of student conceptual development, may be used for understanding teacher planning. The goal of clinical interviewing is to identify the relevant conceptions the subject holds and the perceived relationships among those conceptions. "The method is highly flexible, allowing a skillful researcher both to probe the areas of the knowledge domain of particular interest and to let the subject speak freely, while constantly checking his or her spontaneous remarks for those that will prove genuinely revealing" (p. 197). "Two basic techniques may be employed, a controlled but flexible conversational interview, and an interview centered around a contrived task designed to reveal the nature of a certain aspect of the subject's intelligence" (p. 198).

It is undebatable that teacher-designers at all educational levels select and interpret content for students based on their own beliefs, assumptions, experiences, and reasoning (valid or invalid). The limited evidence about teacher planning at the K-12 level implies that teachers may pursue planning in a partially subconscious way through the construction of implicit "lesson images". Intuitively, one might expect more extensive use of such lesson images in college instruction where the teacher's own interests and background provide fuller immersion in the disciplinary concepts. In contrast to K-12 teachers, however, college instructors may pursue different thought processes in their planning because they have had less exposure to various educational and psychological theories that create awareness of alternative planning strategies. As Schubert (1986, p. 299) points out, while K-12 teachers may fail to fully adopt educational theories, "exposure to theories and practice in using them to interpret situations enhances teachers' capacity to adapt, tailor and combine theories." Currently, only one exploratory study (Powell & Shanker, 1982) has even touched on with these issues among college instructors.

H. Summary

Our review of curriculum literature at the college and pre-college level leads us to the following summary observations and, in some cases, tentative explanations.

1. At both levels of education, the term curriculum is defined in many ways, requiring that researchers and practitioners specify the definition intended before communication can be meaningful.

2. Curricular change processes at the pre-college and college level are occasionally parallel, particularly when the change involves the selection of content and the manner in which the content will be sequenced and taught. Major curricular revisions in the 1950s and 1960s at the high school level, notably in the sciences and mathematics, were implemented nationally after extensive testing and development. Similarly, major shifts in the methods of teaching the disciplines at the collegiate level often involve broad change fostered and disseminated through disciplinary associations and accrediting agencies. Probably because of more direct public accountability and the ease with which lower school disciplinary concepts are understood, massive curricular change at the K-12 level tends to be more public and more thoroughly examined by researchers, and it tends to elicit more public reaction than, for example, an agreement among college-level historians to introduce a newly structured introductory course. Evidence of such curricular change at the college level may be found in the disciplinary journals and fugitive literature regarding specific institutions. Increasingly, however, as attention in higher education focuses on broader issues of integration and coherence, specific types of curricular change with broad applicability are being widely discussed. A well-known example is the research and development known as "writing across the curriculum."

3. At both educational levels there is an extensive literature on "the nature" of the curriculum. Both levels have theorists who take a normative view (what the curriculum should be) and theorists who take a process view (how the curriculum should be developed or designed). Conflicting conceptions or sets of assumptions on which academic planning rest are parallel at the two educational levels but at lower educational levels a larger number of theorists have devoted their attention to the process of developing academic plans. At both educational levels, discourse about curriculum is subject to societal oscillations and trends.

4. The "extra-disciplinary" or broad postsecondary curriculum literature is more general in scope than the pre-college literature. At the college level, public discourse most frequently focuses on the intersection of societal needs and institutional or program mission, on the value of historical traditions and on case study reports that seldom are analyzed in a systematic way. At the pre-college level, even for the lay reader, considerably more literature is available that focuses on the content and principles to be taught, the sequencing of that content, and the needs of the learner. Additionally,

there have been more reported attempts at the K-12 level to articulate these elements—student, teacher, content, setting and to systematically explore their interrelationships.

5. Pre-college educators are more likely to discuss the locus of curriculum decision making as an issue involving considerations of expertise as well as power, where the types of expertise to be considered are more varied and the interest of societal groups more powerful and directive. In collegiate education, however, the locus of day-to-day curriculum decision making is more local and the disciplinary experts/instructors represent or translate the views of broader societal groups in their own terms. Although there are literatures generated by milieu-experts (e.g., counseling, student development experts), and teaching experts (instructional developers, media consultants), these experts are infrequently involved during college curriculum decision making at the program level. Thus, discussions about curricular plans at the college level most frequently may be found at two widely separated levels—that of the individual instructor and that of national reports and reform movements. The middle ground for curricular discussion occurs at the program or departmental level. Very little institutional level discussion occurs except at small colleges where the entire faculty forms an arena for dialogue.

6. Theorists and researchers dealing with public school curriculum planning typically are either knowledgeable about or have direct access to the ideas of others interested in related topics, such as new developments in psychology or socio-demographic changes in the learner population. Thus, the literature at the public school level may reflect new thinking in these fields more rapidly than the literature at the college level. The consideration of new developments in cognitive psychology, for example, is an example of work that has penetrated curriculum thinking designed for public school improvement but is still not familiar to most college instructors outside of the behavioral sciences. Rather, the infiltration of these educationally focused ideas in higher education appears to await the activity of charismatic translators or private consultants whose names and summaries gradually and somewhat selectively become part of the vocabulary of college teachers. It is possible that faculty members at both levels seldom read the original works but rather are stimulated by the translated version of new ideas in curriculum planning and teaching.

7. The ideas of some scholars have reached the common vocabulary of both public school curriculum theorists and discussants of curriculum issues in higher education. Although we have not conducted a systematic study of the extent to which this has taken place, it appears that there are commonalities among those whose ideas have diffused into the colleges. The work of such scholars may have appeal because it has originated with college professors and is grounded in intellectual dimensions or because the vocabulary used is similar to that of the disciplines or deals directly with the intellectual development of students. Examples might include the works of Dressel and Phenix, the work of Bloom, Gagne, and others, the work of Perry on student intellectual development, and the work of Kolb on learning styles. To some extent, the diffusion of this work into higher education depends on attempts of administrators or faculty leaders to broaden exposure of their colleagues.

8. Earlier, we cited a "bandwagon effect" of innovations in higher education, perhaps implying that this effect did not exist in K-12 education. There probably are tendencies at both levels to adopt curriculum plans that a neighboring or peer institution or program has adopted. We suspect, however, that there are more individuals, if not in the lower school themselves, at least in the organizations who study them, who critically assess such changes, attempting to sort out their component factors and resultant effects.

9. Researchers concerned with change process in K-12 school curriculum and those concerned with innovation in higher education present similar caveats about the desirability of involving faculty members in curriculum development and taking into account local needs. The current thrust in K-12 curriculum literature focusing on school-based curriculum development illustrates this point.

10. We have limited knowledge about what assumptions professors in higher education bring to their curricular planning or which theories of curriculum they might espouse. We infer, however, that some divisions do exist based on disciplinary or institutional affiliation, and these perhaps parallel other evidence of such divisions such as two, three or four cultures (Snow, 1959; Gamson, 1966; Stark and Morstain, 1978), research paradigms of the disciplines (Biglan & Morstain, 1973; or professional educational ideologies (Stark, Lowther, & Hagerty, 1986). Certainly the language used in such reports as *Integrity in the College Curriculum* (AAC, 1985) would be classified as "generic" theory; education is treated more as an art than as a science. In contrast, the report *Involvement in Learning* (NIE Study Group, 1984), with its emphasis on clear expectations for students, assessment of learner progress, and cautious assertion that college professors should have some training to teach, leans more toward education as a scientific process and toward "structural" curriculum theory as it is known in the lower school arena. Another example of structural theory occurs in the popularity of personalized or individualized instruction following a "systems approach" among faculty members in the natural sciences and psychology while generic theory is reflected in teaching styles preferred more frequently in the humanities. Since proponents of both the AAC and NIE Study Group reports consider current modes of curriculum planning and execution to be deficient in achieving desired educational outcomes, they may find common ground in "substantive" curricular theory as recognized by K-12 educators.

11. Ironically, in higher education, where a great deal is attention is focused on the structure of knowledge and the conceptual relationships in various disciplines, three common practices illustrate the extensive research and development task that must precede full acceptance of the ideas cognitive psychologists are developing. First, in using implicit, rather than explicit intended learning outcomes, college teachers do not always clarify for themselves or for their students their own conceptual maps of the disciplines. Second, there appears to be little conscious attention to the responsibility of the teacher to design courses in ways that will link the structure of knowledge with the student's prior knowledge structure. Third, many learning activities in higher education are passive and appear to ignore the student's active role in constructing meaning.

The research on cognitive processing in students has led to new views of knowledge, at least as far as psychologists are concerned, and these views are having an effect on curriculum thinking at the K-12 educational level. Translation of these notions to the arena of college teaching appears to be needed if the curriculum is to be coherent, the expectations clear, and the learners involved.

III. Models for College Curricular Planning and Research

Based on the information in the literature of collegiate and pre-collegiate curriculum, we have developed a framework that we believe will provide a fruitful basis for a research and development program to improve college curricular planning. We encourage others to select other starting points and to pursue other paths of equal promise.

Six assumptions underlie our proposed framework.

1. Useful recommendations will involve curricular change that is difficult to achieve.

There appears to be little need for additional research that merely describes (1) the sets of courses offered by colleges or taken by students, (2) the time frame in which courses are offered, or (3) programmatic innovations that remain in vogue for short periods. As Bergquist and his colleagues have pointed out, change in such curricular dimensions as time, space, and resources is easily completed and readily described. Yet, with the exception of some interdisciplinary programs, most reported curricular change describes variations in such dimensions (Bergquist et al., 1981) or has occurred due to course proliferation in times of programmatic growth (Fincher, 1986). Knowledge to support more enduring improvements in student learning will result from research that explores the levels of curriculum planning that are most difficult to change. These include the categories Bergquist et al labeled changes in organization, procedures, and outcomes. This is a challenging area of research that must be grounded in better knowledge of the educational assumptions actually used by college instructors as they plan their courses.

2. A systematic, rational approach to curriculum planning is needed.

The extensive literature in higher education containing visions of the educated person, exhortations for holistic education, and clarion calls for the values of particular educational processes, appears to contain little documented evidence of changes in student educational achievement. Argument produces counterargument, with much accepted on faith in an enterprise that, ironically, stresses the importance of careful analysis in other arenas.

Many faculty members might claim that college curriculum planning is more art than science. We believe, however, that it can proceed more systematically, building on widely accepted principles. Thus, bearing in mind that fields of study differ widely and that all students and professors may not benefit equally from the same approach, we plan to test the efficacy of systematic approaches to college curriculum planning. These approaches assume that, consciously or unconsciously, professors make a series of decisions or choices among alternatives when planning their courses and programs.

Therefore, we accept the postulate put forth by Hewson and Posner (1984) that it is better for teachers to have considered alternative ways of selecting and organizing content and to have chosen from among them, than to remain unaware that alternatives exist.

We join the authors of *Involvement in Learning*, (NIE, 1984) and structuralist curriculum theorists in suspecting that students who have a clear idea of what they are expected to learn and who know when they have met those expectations will be more effective learners. If this is true, faculty members are responsible for helping students articulate goals and for devising ways to provide feedback on goal achievement. It seems to us difficult, if not impossible, for instructors to implement the recommendations in *Involvement in Learning* unless they have consciously selected and articulated intended learning outcomes (their expectations for students) and considered how student achievement may be demonstrated. Yet, instructional developers and researchers tell us that these are the very activities to which college teachers may give short shrift (Diamond et al., 1975; Powell & Shanker, 1982). We believe it important then, to explore what assumptions, alternatives, and procedures are now used by college professors in curriculum planning to test which of a range of options might lead faculty to consider a broadened repertoire of alternatives.

3. The organization of a discipline provides a realistic starting point for research and constitutes a general case from which other specific cases may be developed.

We believe the position expressed at two educational levels (Dressel & Marcus, 1982; King & Brownell, 1966) that the way various disciplines organize knowledge for study represents reality. Furthermore, using the disciplines as organizing frameworks either for knowledge or for programmatic structure, does not, inherently, result in narrowness or overspecialization. Organizing structures do not produce such results; rather goals established by humans and human choices of whether to regard the structures as barriers or opportunities to the achievement of goals determine the results.

The various organizing frameworks and characteristics of the disciplines are the familiar ground from which faculty develop courses and programs both by virtue of their training and the way colleges and universities are organized. Curriculum improvements that advocate the wholesale overturn of such structures have been demonstrably short-lived. The disciplinary frame must be used but it may well be used in a "contextual" way (Dressel & Marcus, 1982) in conjunction with new ideas and concepts that have been useful in other educational settings.

We disagree with Halliburton (1977) that it is an impossible task to identify the conceptual structures of the disciplines in order to better understand how they interact with educational philosophies and ways of sequencing content for learners. The task is indeed large, and it must proceed in cooperation with the faculty themselves, but it is not impossible. The role of the curriculum researcher may, in this regard, be likened to that of the anthropologist who observes a culture, clarifies the observations with the members of that culture, and observes again with increased perspective. Both the curriculum generalist and a person representing the discipline have a role to play in articulating the characteristics of disciplines that affect teaching and learning.

There are many tentative categorizations of disciplinary paradigms that might be used as a basis for exploration. For example, some have suggested that the sciences are organized according to sequential paradigms and the humanities in a concentric way. Halliburton (1977) has viewed the sciences as proceeding from a logical base ,the humanities as proceeding from an imaginative base, and the social sciences as proceeding from a relational base. Dressel and Marcus (1982) have, a priori, classified each of the typical college disciplines as contributing to student development in one or more of the major "realms of meaning" outlined by Phenix (1964). Perhaps the simplest categorization is that empirically derived by Biglan (1973) in a study of college departments (rather than disciplines per se) which involved three dimensions: degree of application (applied vs pure), degree of paradigmatic certainty (hard vs soft) and focus (life vs non-life).

Common to all these characterizations is a view that the disciplines involve (1) a set of objects or phenomena that humans have tried to explain; (2) a set of facts, concepts, and theories that have evolved from this effort at explanation; (3) a system of symbols that facilitate discourse; (4) a mode of inquiry that has developed and may be undergoing change; (5) a value component (including the value of objective neutrality); and (6) linkages with other disciplines (Dressel & Marcus, 1982).

In studying college curricula, it is necessary but not sufficient, to understand more about these disciplinary paradigms. The insufficiency stems from the fact that over fifty percent of college students study the traditional disciplines not to expand the further organization of man's knowledge but to apply current knowledge through an occupation or profession. The occupations and professions are predominantly interdisciplinary, drawing from the base disciplines in varying proportions, and they involve an additional set of characteristics structured by relationships with society and with professional communities. Researchers have only begun to explore the ideologies and paradigms that may influence educational strategies in various professional fields (Stark, Lowther, & Hagerty, 1986).

4. More balanced contributions from individuals with varied expertise can be useful.

Typically, professors are seen as defending vigorously the sanctity of the classroom, designing and teaching their courses independently according to their priorities and best judgments. Based on this stereotype, one might assume that curricular planning in higher education belongs unequivocally in the cell in Short's (1983) model (Figure 3) designated as "scholar-dominated, open-adaptation, site specific." There is serious question, however, whether this assumption continues to hold for most colleges and universities today. Many community colleges, and in some states public four-year colleges, are finding that decisions about course content now involve external policy makers whose judgments are defended on grounds of limited resources or the need for articulation with other educational sectors. Facility restrictions, faculty unionization, concern about program duplication, assignment of teaching responsibilities to groups of graduate students with diverse preparation, pressures from advocacy groups (referred to by Short as "milieu experts"), enrollment-based budgets, and the emergence of college-level teacher-proof curriculum materials are merely a few of the forces that in many institutions invade the traditional (and possibly mythical) autonomy of the professor.

While the door to curriculum planning has been opened forcibly by some interest groups, it has remain closed to potentially helpful non-discipline curriculum experts interested in becoming partners in improving learning. We defend the principles of site-specific decisions and open adaptation, but believe a pattern of balanced participation of experts would prove fruitful. Such a balanced pattern might include greater participation, for example, by individuals knowledgeable about the psychology of learning, the characteristics of students, the relation of education and work, and instructional design. Recognition of contributions these fields have to offer would bring to bear more fully on curriculum decisions more of the varied and extensive literature relevant to curriculum planning (see Figure 1.)

Our experience in other curricular projects (Stark, Lowther, & Hagerty, in progress) indicates that productive partnerships among individuals with varied expertise in education is possible. We have found that merely asking questions about curricular goals and strategies for curricular planning in fields where we are not experts of the discipline results in increased productive thinking about alternatives among faculty members in those fields. Although they frequently cite non-supportive reward systems, most faculty members believe teaching and learning are important and are willing to discuss curriculum planning in a nonthreatening context. Thus far, most faculty development programs have concentrated on teaching techniques or personal development. Improvement in curriculum planning has been long neglected and there is more hesitation than need be about getting such discussions started.

5. Student involvement and knowledge integration may be synergistic partners.

At the same time that methods to increase student "involvement" in their learning is being discussed nationally (NIE, 1984), cognitive psychologists are pursuing the idea that humans learn by integrating new material with old in new knowledge structure patterns. Higher education observers have noted that, for many students, college instruction seems to be concerned with transmittal of facts and principles that are insufficiently connected with the learner's frame of reference to be meaningful integrated (Richardson et al., 1983); (Cross, 1986) As a corrective action, both psychologists and curriculum theorists suggest that the way the knowledge to be taught is integrated may be closely connected with the way students establish meaning. Educators are talking about a curriculum with "integrity" and "coherence" (AAC, 1985), higher education researchers of a sociological bent are talking about "academic and social integration of students" (Tinto, 1975; Pascarella & Terenzini, 1979), and psychologists are talking about helping the student integrate knowledge. The connection between these discussions seems more than coincidental and certainly worthy of pursuit (Stark, 1986).

We suspect that most professors do attempt to provide an "integrated" curriculum by choosing and arranging their subject matter in a way that seems logical to them. Sometimes, but not always, it also seems logical to students and encourages involvement and effort. It is possible that in their curriculum planning, professors are confined to a single definition of integration by their discipline, by the way they themselves were taught, by assumptions they hold about educational purposes and processes, by failure to explicitly examine their assumptions, or by a variety of other factors. By exploring these relationships within a disciplinary framework we believe some clarity may be brought to the concepts of curricular integration that will result in recommendations for course design to benefit students, faculty, and the enterprise of higher education.

6. Recommendations about curriculum planning must be demonstrably linked to improved student outcomes.

The limited research on whether student outcomes vary with different educational environments has rather consistently followed the input-environment-output model (Astin, 1970), attempting to statistically equate groups of students according to entering characterstics. Since our ultimate goal is to discover whether the use of specific curriculum design strategies results in improved student outcomes, our research will also follow this value-added model. Despite its difficulties of implementation, we know of no other design that comes as close to being able to infer causes and effects. Nonetheless, student differences are too important to be disregarded as statistically controllable. Different types of curricular integration may produce different results for different students at different stages of knowledge and intellectual development. It is as important to examine interaction effects between student characteristics and curricular designs as it is to control student characteristics in examining aggregate patterns. With Pascarella (1985a), we suspect that previous levels of research have used too gross a level of aggregation (typically institutional) to be fully sensitive to student outcomes. Thus, fruitful curricular research will concentrate at the course and program level where at least some student involvement with teaching and learning occurs.

The primary research question of current importance is:

> Does the way college courses and programs are designed and sequenced affect student learning?

Answering this question can provide faculty members empirically based recommendations on how they can become more effective curriculum designers at both the course and the program level. These two levels are likely to have greatest impact on student learning in today's colleges.

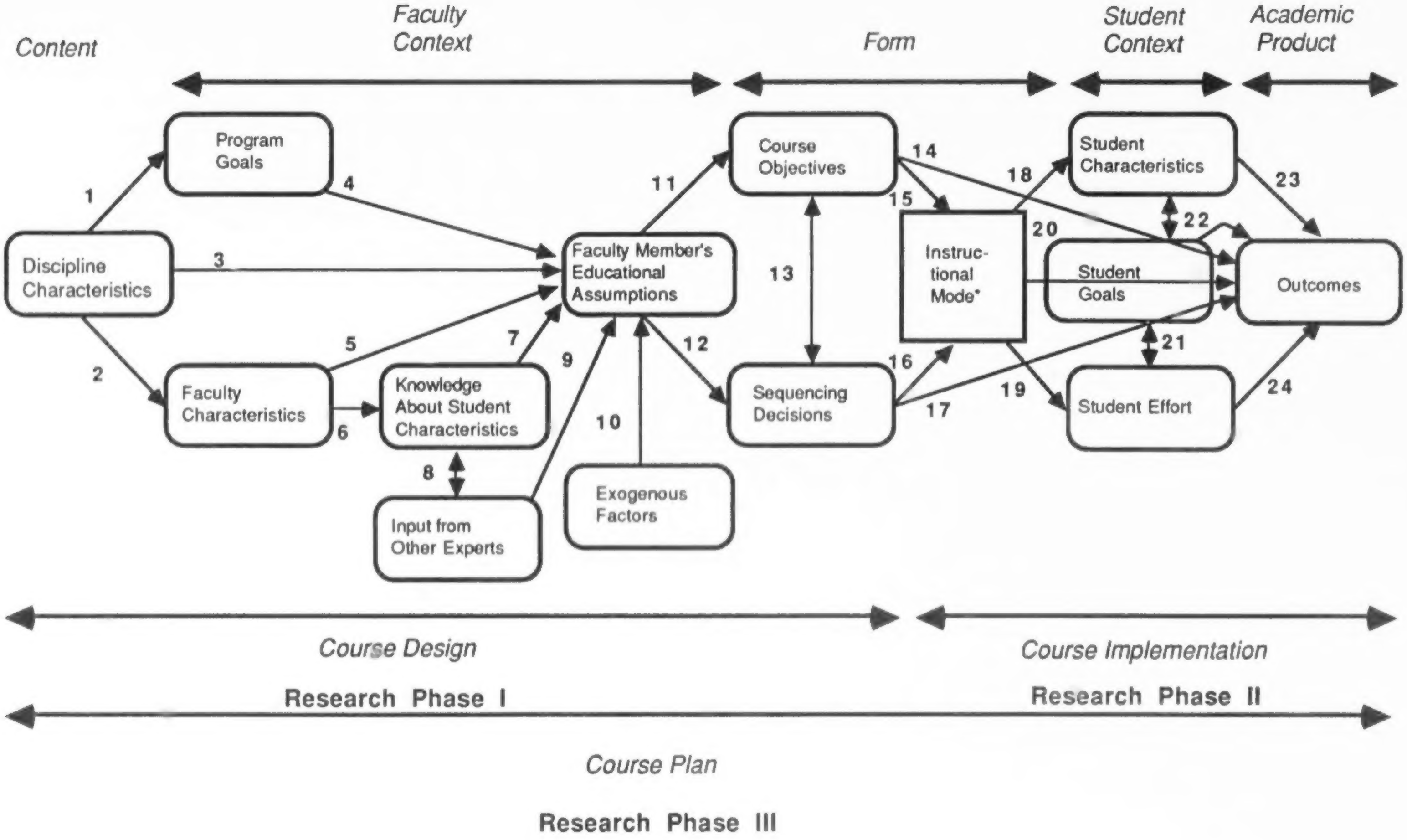
Important subsidiary questions are:

> What are the factors that influence how faculty make decisions about selecting and sequencing the content in their courses? What are the relative strengths of various influences?
>
> Do various schemes for selecting and sequencing course content produce different student outcomes when student characteristics, efforts, and instructional mode are taken into account?

One way of pursuing these questions is through an integrated series of correlational, quasi-experimental and experimental studies designed to explore relationships such as those depicted in Figure 6. Figure 6 tentatively describes one theoretical model of curricular planning and its relationship to instructional outcomes. It is important to note, however, that the figure, as currently drawn, implies that course (or program) design proceeds (or should proceed) in a linear fashion. This assumption is subject to question (Posner & Rudnitsky, 1982; Clark & Peterson, 1986). Thus, while such diagrams provide a starting point for research, the form of the model is subject to modification and elaboration.

Although Figure 6 refers to course design, a parallel process can be outlined for program planning. We hypothesize that at least one additional variable, namely faculty members' "political" assumptions, will interact with educational assumptions in the program planning model.

The appropriate penultimate research design is probably quasi-experimental and wil depend on the measurement of student outcomes in existing settings rather than settings


Content
Faculty Context
Form
Student Context
Academic Product
Program Goals
Discipline Characteristics
Faculty Characteristics
Knowledge About Student Characteristics
Input from Other Experts
Faculty Member's Educational Assumptions
Exogenous Factors
Course Objectives
Sequencing Decisions
Instructional Mode*
Student Characteristics
Student Goals
Student Effort
Outcomes
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
Course Design
Research Phase I
Course Implementation
Research Phase II
Course Plan
Research Phase III

*Instructional process will be studied in a separate NCRIPTAL program.

Figure 6. Tentative curriculum design model.

manipulated by the experimenter. Using quasi-experimental designes is practical since it does not require that faculty members depart from their existing course designs or teaching practices without evidence that such departures will benefit students.

Eventually, researchers should conduct experimental tests of the entire model (Figure 6) building upon results from and including modifications developed in previous phases.

This will involve cooperation of faculty members willing to redesign courses as co-experimenters. Methodological details of such research plans will be developed in a subsequent paper along with a research time line, potential instrumentation, and proposed analytic techniques.

Based on the assumptions discussed above and the tentative model shown in Figure 6, we propose explorations of curricular integration based on several premises drawn from those covered in both higher education and public school literature.

> Short's Strategy III (1983; see Figure 3) which assumes that, as distinguished from broad policy decisions, curriculum plans should be developed by a process that is site-specific, includes individuals with varying types of expertise, and is open to adaptation by the instructor.
>
> Bergquist, Gould, and Greenberg's point (1981) that the more important changes in academic planning may be the most difficult to make.
>
> Stark's (1985) definition (also see Taba, 1962; Toombs, 1977-78) of curriculum as an academic plan comprising several elements.
>
> Toombs' idea (1977-78) that curriculum planning is a design process including dimensions of content, context, and form.
>
> Dressel and Marcus' (1982) ideas concerning disciplinary content as the appropriate organizing structure for collegiate education but with attention to the context in which the material is learned, the context within which it is likely to be used, and the modifications of these conceptions for occupational and professional curricula.
>
> The NIE Study Group (1984) recommendations that expectations for student achievement should be clearly articulated and measured.
>
> A composite set of intended outcomes that occur repeatedly throughout the higher education literature and include (1) discipline-based learning, (2) generic abilities that cross disciplines, (3) cognitive growth.
>
> Consideration of program purposes, institutional purposes, student characteristics and purposes and faculty educational beliefs as mediating contextual variables in examining both a value-added model of student outcomes and the interaction of student differences with curriculum design.
>
> Pace's (1984) concept of student quality of effort as a mediating variable, interacting with both other student characteristics and with curriculum design.
>
> Posner's (1984) analysis of content sequencing, including both the six-fold classification of ways in which disciplinary content can be organized and the two-dimensional classification of commonality and temporality in sequencing.
>
> Dressel's idea, reinforced by recent developments in cognitive psychology (Posner & Rudnitsky, 1982), that the purpose of structuring course content is to help the learner achieve order, continuity, consistency, uniformity, and integration.

A. Definitions

Since we have found varied definitions of curricular terms in common use, we present those that we suggest for use by researchers.

College course—A formal unit of study offered to students in a specific time frame for a specific number of academic credit hours. Research concerned with courses offered at the pre-baccalaureate or pre-associate degree level should be conducted separately.

College program—A planned sequence of courses (or courses and experiences) that is judged by faculty to represent an appropriate educational plan for students to follow over a period of one term to four years. A program may take many forms. For example, it might be a plan of general education designed for certain groups of students, a plan for students studying a field in depth (major), or an interdisciplinary group of studies. A program is not necessarily congruent with an organizational unit such as a department but it is identified with some group of faculty (and in small colleges perhaps an entire faculty) who are responsible for its design and for guiding students who pursue the program.

Curriculum—An academic plan incorporated in a course or a program or both and including:

1. A selection of knowledge, skills, and attitudes to be learned.
2. A selection of subject matter in which to embed educational activities directed at acquiring the knowledge, skills, and attitudes.
3. A design for the educational activities, including sequencing of materials.
4. A consideration of the previous backgrounds and skills of the learners.
5. A selection of materials, sources, tools, and settings to be used in the learning.
6. A method for evaluating the learning.
7. A system for considering and revising items 1 through 5 in light of the result of 6.

Student learning—Student learning includes evidence of change (in a direction specified as desirable) in conceptual knowledge, skills, attitudes, and behaviors that are generally expected outcomes of college courses or expected outcomes specific to a particular course or program. Generally, these outcomes can be viewed as falling into three categories that are undoubtedly interrelated in complex ways and are listed separately only for convenience. The items in Category I, below are typically called academic achievement and usually are course or program specific. Items in Category II may be course specific but are also viewed as "general learned abilities." Category III includes "operant" outcomes (Winter, McClelland & Stewart, 1982), sometimes called cognitive outcomes, that indicate general intellectual growth.

I. Learning of course-related vocabulary, facts, principles, concepts, methods of inquiry, and methods of application.

II. Communication skills
Problem-solving skills

III. Cognitive characteristics such as conceptual flexibility:
Changes in orientation toward inquiry or toward the material encompassed in the course or program
Evidence of becoming an independent thinker
Evidence of becoming a continuing learner

(See also a slightly different categorization by Posner & Rudnitsky, 1982, encompassing cognitions, cognitive skills, psychomotor-perceptual skills, and affective understandings.)

Course design—The process used by faculty in developing an academic plan for a course. The process typically includes concern with content, context, and form.

Program planning—The process used by faculty in developing an academic plan for a program or a set of courses.

Content—The structure and subject of a discipline or field from which the particular subject matter to be learned is chosen and to which the course objectives are related.

Context–(1) The educational orientation or set of assumptions about education that the faculty member brings to the course design process, (2) the goals or mission of the institution and program in which a course is incorporated, (3) the characteristics of the learners and, (4) the objectives and expectations the learner has for the course or program.

Form–(1) The course objectives; (2) the way in which content is sequenced; (3) the instructional mode.

B. Tentative Definitions

Since the initial stages of curriculum research will be exploratory, we begin with some definitions and frameworks drawn from previous literature that we suspect will need to be modified. They are set forth here to clarify the nature of the elements in the proposed general research model.

Discipline characteristics (Content)– Subject to modification and expansion, the following are assumed to be characteristics of traditional academic disciplines (based on Dressel and others):

A set of objects or phenomena that humans try to explain

A set of facts, concepts, and theories that have evolved from the effort to explain

A system of symbols that facilitates discourse among those engaged in the process of explanation

A mode (or modes) of inquiry that has evolved to facilitate explanation and may be undergoing modification

A value component concerning what objects or phenomena are important to explain

A set of linkages or potential linkages with other disciplines

Professional field characteristics (Content)– Subject to modification and expansion, the following definitions are proposed as paralleling the characteristics of disciplines (based on Stark, Lowther, and Hagerty).

Contextual orientation– the societal context or settings in which the profession is practiced

Traditional professional orientation– the application of an integrated set of concepts and skills to professional practice as currently defined

Value orientation– the values espoused by the professional community and transmitted in the socialization of students

Adaptive orientation– the modes of improvement of the profession, including adaptation of both methods and professional skills to contextual changes.

Linkages– the linkages of the professional field to other professional fields and disciplines

Faculty characteristics (Context)– Based on prior research, a limited set of demographic characteristics should be collected as covariates in curricular research. They include: age; gender; highest degree held; academic rank; years since highest degree; years of teaching; teaching vs. research orientation; faculty experience; prior non-academic professional experience; faculty members' role view in teaching, research, professional practice, and service; and faculty members' exposure to/receptivity to ideas from experts in other fields.

Educational assumptions (Context)– The purposes or orientation a faculty member brings to the curriculum design process. A number of schemes for ascertaining assumptions should be explored, including (1) models of curricular planning (Gay, 1980), (2) conflicting conceptions of curriculum (Eisner & Vallance, 1974), (3) philosophical views on teaching (Dressel & Marcus, 1982), and (4) orientations toward educational purpose (Stark & Morstain, 1978).

Expert input (Context)– Influences other than faculty members' own disciplinary and educational orientations that may enter the course design process. Such input may include interaction with or influence from learning psychologists, media experts, or curriculum designers or may include institutional constraints or facilitators such as resources and instructional materials.

Course objectives (Form)– An set of objectives (implicit or explicit outcomes) the faculty member hopes students will achieve as a result of the course (or program). Such objectives typically will resemble curricular "macroelements" rather than "microelements" (Posner, 1974). That is, they will be at a level of specificity appropriate to a course (e.g., apply the laws of motion to solution of a particular problem; present one's ideas effectively before a group; analyze an incident in the context of its historical antecedents; develop a sense of professional ethics) rather than detailed behavioral objectives or intended learning outcomes sometimes characterized in lower-level educational literature.

Course sequencing (Form)– Subject to expansion and modification, six ways of sequencing curriculum macroelements (Posner, 1974; Posner & Strike, 1985) seem useful as a guiding framework: (1) world- related; (2) concept-related; (3) inquiry-related; (4)learning-related; (5) utilization-related and; (6) implementation-related.

C. Conclusion

As appropriate to NCRIPTAL's mission, we have identified some useful frameworks for studying the college curriculum. From the wide variety of possible models, we have selected and augmented one that seems fruitful to guide our exploration. A key factor affecting our choice is our concern that the interaction of academic course and program design with student learning outcomes has not received enough attention from either researchers or practitioners. To understand this linkage and subsequently to explore its usefulness as a place to improve teaching and learning is the primary question for our research.

In subsequent papers in this series we will report on a multiphase research program based on the model we have chosen. These investigations will focus at the course and program level and will involve both explorations intended to generate hypotheses and correlational and confirmatory studies to test them. Eventually, the framework that best represents our emerging understandings may differ from the initial one we have outlined here.

Despite the many methodological and definitional problems that researchers encounter in investigating the impact of the curriculum, understanding curriculum issues may be easier than using this understanding to bring about curriculum change. The times are right, nonethless, for a systematic effort to discover substantive directions and strategies for

References

[NOTE: In some instances references have been made to early drafts of works that subsequently may have been published in altered form.—J.S. and M.L.]

Adelman, C. (1984). *Starting with students: Promising approaches in American higher education.* Washington, DC: National Institute of Education and American Association for Higher Education.

Adelman, C. (1985). *The standardized test scores of college graduates, 1964-1982.* Washington, DC: National Institute of Education and American Association for Higher Education.

Apple, M. (1975). The hidden curriculum and the nature of conflict. In W. Pinar (Ed.), *Curriculum theorizing* (pp. 95-119). Berkeley, CA: McCutchan.

Association of American Colleges. (February 1985). *Integrity in the college curriculum : A report to the academic community.* Washington, DC: Association of American Colleges.

Astin, A. W. (1970). The methodology of research on college impact, part one. *Sociology of Education, 43,* 223-254.

Astin, A. W. (1978). *Four critical years.* San Francisco: Jossey-Bass.

Astin, A. W. (1983). Review of A. W. Chickering (Ed.), Modern American college. *Contemporary Psychology, 28,* 63-64.

Astin, A. W. (1984). *Achieving educational excellence.* San Francisco: Jossey-Bass.

Astin, A. W., & Panos, R. (1969). *The educational and vocational development of college students.* Washington, DC: American Council on Education.

Ausubel, D. P. (1968). *Educational psychology: A cognitive view.* New York: Holt, Rinehart and Winston.

Axelrod, J. (1968). Curricular change: A model for analysis. *The Research Reporter, 3,* 1-3.

Axelrod, J. (1969). *Search for relevance.* San Francisco: Jossey-Bass.

Axelrod, J. (1973). *The university teacher as artist.* San Francisco: Jossey-Bass.

Beauchamp, G. A. (1981). *Curriculum theory.* Itasca, IL: F. E. Peacock.

Beauchamp, G. A. (1982). Curriculum theory: Meaning, development and use. *Theory into Practice, 21*(1), 23-27.

Bell, D. (1966). *The reforming of general education.* New York: Columbia University Press.

Bell, D. (1967). Reforming general education. In C . B. T. Lee (Ed.), *Improving college teaching* (pp. 347-359). Washington, DC: American Council on Education.

Bennett, W. (1984). *To reclaim a legacy.* Washington, DC: National Endowment for the Humanities.

Bergquist, W. H. (1977). Diversity in the college curriculum. In A. W. Chickering, D. Halliburton, W. H. Bergquist, & J. Lindquist (Eds.), *Developing the college curriculum* (pp. 79-85). Washington, DC: Council for the Advancement of Small Colleges.

Bergquist, W. H., Gould, R. A., & Greenberg, E. M. (1981). *Designing undergraduate education: A systematic guide.* San Francisco: Jossey-Bass.

Berk, R. A. (1980). A consumer's guide to setting performance standards on criterion-referenced tests. *Review of Educational Research, 56*(1), 137-171.

Berman, L. (1968). *New priorities in the curriculum.* Columbus, OH: Merrill.

Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology, 57*(3), 195-203.

Blackburn, R., Armstrong, E., Conrad, C., Didham, J., & McKune, T. (1976). *Changing practices in undergraduate education.* Berkeley, CA: Carnegie Council on Policy Studies in Higher Education.

Bok, D. (1974). On the purposes of undergraduate education. [Special Issue on American higher education: Toward an uncertain future]. *Daedalus*, 159-172.

Bowen, H. R. (1977). *Investment in learning.* San Francisco: Jossey-Bass.

Bowen, H. R. (1981). The baccalaureate degree: What does it mean? What should it mean? *AAHE Bulletin, 34*,(3).

Bowen, H. R. (1985, September). *The reform of undergraduate education: Estimated costs.* Paper delivered at Wingspread.

Broudy, H. S., Smith B. O., & Burnett, J. (1964). *Democracy and excellence in American secondary education: A study in curriculum theory.* Chicago: Rand McNally.

Bruner, J. S. (1960). *The process of education.* Cambridge, MA: Belknap Press.

Bruner, J. S. (1966). *Toward a theory of instruction.* Cambridge, MA: Belknap Press.

Butts, R. F. (1939). *The college charts its course: Historical conceptions and current proposals.* New York: McGraw Hill.

Calfee, R. (1981). Cognitive psychology and educational practice. In D. C. Berliner (Ed.), *Review of research in education* (pp. 3-73). Washington, DC: American Educational Research Association.

Calfee, R., & Drum, P. (1986). Research on teaching reading. In M Wittrock (Ed.), *Handbook of research on teaching*, (3rd ed., pp. 804-849). New York: Macmillan.

Carnegie Foundation for the Advancement of Teaching. (1977). *Missions of the college curriculum: A contemporary review with suggestions.* San Francisco: Jossey-Bass.

Carnegie Foundation for the Advancement of Teaching. (1985). General education: New support growing on campuses. *Change, 17*(6), 27-30.

Chickering, A. W. (1969). *Education and identity.* San Francisco: Jossey-Bass.

Chickering, A. W. (1981). Integrating liberal education, work and human development. *AAHE Bulletin, 33*, 7.

Chickering, A. W., & Associates (1981). *The modern American college.* San Francisco: Jossey-Bass.

Chickering, A. W., Halliburton, D., Bergquist, W. H., & Lindquist, J. (1977). *Developing the college curriculum.* Washington, DC: Council for the Advancement of Small Colleges.

Chin, R. (1967). Basic strategies and procedures in effecting change. In E. L. Morphet & C. O. Ryan (Eds.), *Planning and effecting needed changes in education* (pp. 39-57). New York: Citation Press.

Clark, C. M., & Elmore, J. L. (1979). *Teacher planning in the first weeks of school.* (Research Series, No. 56). East Lansing, MI: Michigan State University, Institute for Research on Teaching.

Clark, C. M., & Peterson, P.L. (1986). Teacher's thought processes. In M. C. Wittrock (Ed.), *Handbook of research on teaching*, (3rd ed., pp. 874-905). New York: Macmillan.

Clark, C. M., & Yinger, R. J. (1979). Teachers' thinking. In P. L. Peterson and H. J. Walberg (Eds.), *Research on teaching* (pp. 231-263). Berkeley, CA: McCutchan.

Cobb, W. D. (1983). General education: Purpose and perspectives. *Liberal Education, 69*(4), 353-367.

Cole, C. C., Jr. (1982). *Improving instruction: Issues and alternatives for higher education.* Washington, DC: American Association for Higher Education. AAHE/ERIC Research Report 4.

College Board. (1983). *Academic preparation for college: What students need to know and be able to do.* New York: The College Board.

Confrey, J. (1981). Conceptual change analysis: Implications for mathematics and curriculum. *Curriculum Inquiry, 11*(3), 243-257.

Connelly, F. M. (1972). The functions of curriculum development. *Interchange, 3*, 77-161.

Connelly, F. M., & Lantz, O. (1985). Definitions of curriculum. In T. Husen and T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 1160-1163). New York: Pergamon Press.

Conrad, C. F. (1978a). A grounded theory of academic change. *Sociology of Education, 51*, 101-112.

Conrad, C. F. (1978b). *The undergraduate curriculum: A guide to innovation and reform.* Boulder, CO: Westview Press.

Conrad, C. F. (Ed.). (1985). *ASHE reader on academic programs in colleges and universities.* Lexington, MA: Ginn Press.

Conrad, C. F., & Pratt, A. M. (1983). Making decisions about the curriculum: From metaphor to model. *Journal of Higher Education, 54*(5), 16-30.

Conrad, C. F., & Pratt, A. M. (1986). Research on academic programs: An inquiry into an emerging field. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. II, pp. 235-273). New York: Agathon Press.

Conrad, C. F. & Wyer, J. C. (1980). *Liberal education in transition.* AAHE/ERIC Research Report No. 3. Washington, DC: American Association for Higher Education.

Costa, A. L. (Ed.). (1985). *Developing minds: A resource book for teaching thinking.* Washington, DC : Association for Supervision and Curriculum Development.

Cross, K. P. (1971). *Beyond the open door.* San Francisco: Jossey-Bass.

Cross, K. P. (1976). *Accent on learning: Improving instruction and reshaping the curriculum.* San Francisco: Jossey-Bass.

Cross, K. P. (1985). Making students successful: The search for solutions continues. *Change, 17*(6), 48-51.

Cross, K. P. (1986). *Taking teaching seriously.* Address presented at the American Association for Higher Education, Washington, DC: March 1986.

Cronbach, L. J., & Furby, L. (1970). How we should measure "change"– or should we? *Psychological Bulletin, 74*(1), 68-80.

Curtis, M. H. (1980). Commentary. In *Improving Teaching and Institutional Quality. Current Issues in Higher Education, #1.* Washington, DC: American Association for Higher Education.

Davis, R. H., Strand, R., Alexander, L. T., & Hussain, M. N. (1982). The impact of organizational and innovator variables on instructional innovation in higher education. *Journal of Higher Education, 53*(5), 568-586.

Derry, S. J., & Murphy, D. A. (1986). Designing systems that train learning ability: From theory to practice. *Review of Educational Research, 56*(1), 1-39.

Diamond, R. M., Eickmann, P. E., Kelly, E. F., Holloway, R. E., Vickery T. R., & Pascarella, E. T. (1975). *Instructional Development for Individualized Learning in Higher Education.* Englewood Cliffs, NJ: Educational Technology Publications.

Dieker, R. J. (1978). Curriculum development and student needs. *Resources in Education*, ED 166 749.

Dill, D. D., & Friedman, C. P. (1979). An analysis of frameworks for research on innovation and change in higher education. *Review of Educational Research, 49*, 411-435.

Donald, J. G. (1983). Knowledge structures: Methods for exploring course content. *Journal of Higher Education, 54*(1), 31-41.

Donmoyer, R. (1985). Classroom organization and ability grouping. In T. Husen and T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 746-750). New York: Pergamon Press.

Dressel, P. L. (1971). *College and university curriculum* (2nd ed.). Berkeley, CA: McCutchan.

Dressel, P. L. (1976). *Handbook of academic evaluation.* San Francisco: Jossey-Bass.

Dressel, P. L. (1980). *Improving degree programs.* San Francisco: Jossey-Bass.

Dressel, P. L., & Delisle, F. H. (1969). *Undergraduate curriculum trends.* Washington, DC: American Council on Education.

Dressel, P. L., & Marcus, D. (1982). *Teaching and learning in college.* San Francisco: Jossey-Bass.

Egan, K. (1979). *Educational development.* New York: Oxford University Press.

Eggleston, J. (Ed.). (1979). *Teacher decision-making in the classroom.* Boston: Routledge and Kegan Paul.

Eisner, E. W. (1979). *The educational imagination: On the design and evaluation of school programs.* New York: Macmillan.

Eisner, E. W., & Vallance, E. C. (Eds.). (1974). *Conflicting Conceptions of Curriculum.* Berkeley, CA: McCutchan.

El-Khawas, E. (1985). *Campus Trends, 1984.* Higher Education Panel Report No. 65. Washington, DC: American Council on Education.

El-Khawas, E. (1986a). *Campus Trends, 1985.* Higher Education Panel Report No. 71. Washington, DC: American Council on Education.

El-Khawas, E. (1986b). *Campus Trends, 1986.* Higher Education Panel Report No. ?. Washington, DC: American Council on Education.

Ewell, P. (1985). Assessment: What's it all about? *Change, 17*(6), 32-36.

Fantini, M., & Weinstein, G. (1968). *The disadvantaged: Challenge to education.* New York: Harper and Row.

Feisel, L. D., & Schmitz, R. J. (1979). Systematic curriculum analysis. *Engineering Education*, 409-413.

Feldman, K. A. (1970). *Research strategies on college impact.* Iowa City: American College Testing Service.

Fincher, C. (1985). Learning theory and research. In J. C. Smart (Ed.), *Higher education: Handbook of research and theory* (Vol. I, pp. 63-96). New York: Agathon Press.

Fincher, C. (1986). Trends and issues in curricular development. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. II, pp. 275-308). New York: Agathon Press.

Fiol, C. M., & Lyles, M. (1985). Organizational learning. *Academy of Management Review, 10*(4), 803-813.

Ford, G. W., & Pagno, L. (1964). *The structure of knowledge and the curriculum.* Chicago: Rand McNally.

Foshay, A. W. (1969). Curriculum. In R. I. Ebel (Ed.), *Encyclopedia of educational research* (4th ed., pp. 275-280). New York: Macmillan.

Fullan, M., & Pomfret, A. (1977). Research on curriculum and instruction implementation. *Review of Educational Research, 47*(1), 335-397.

Gaff, J. G. (1983). *General education today: A critical analysis of controversial practices and reforms.* San Francisco: Jossey-Bass, 1983.

Gagne, R. M. (1965). *The conditions of learning.* New York: Holt, Rinehart, and Winston.

Gagne, R. M., & Dick, W. (1983). Instructional psychology. *Annual Review of Psychology, 34*, 261-295.

Connelly, F. M. (1972). The functions of curriculum development. *Interchange, 3*, 77-161.

Connelly, F. M., & Lantz, O. (1985). Definitions of curriculum. In T. Husen and T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 1160-1163). New York: Pergamon Press.

Conrad, C. F. (1978a). A grounded theory of academic change. *Sociology of Education, 51*, 101-112.

Conrad, C. F. (1978b). *The undergraduate curriculum: A guide to innovation and reform.* Boulder, CO: Westview Press.

Conrad, C. F. (Ed.). (1985). *ASHE reader on academic programs in colleges and universities.* Lexington, MA: Ginn Press.

Conrad, C. F., & Pratt, A. M. (1983). Making decisions about the curriculum: From metaphor to model. *Journal of Higher Education, 54*(5), 16-30.

Conrad, C. F., & Pratt, A. M. (1986). Research on academic programs: An inquiry into an emerging field. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. II, pp. 235-273). New York: Agathon Press.

Conrad, C. F. & Wyer, J. C. (1980). *Liberai education in transition.* AAHE/ERIC Research Report No. 3. Washington, DC: American Association for Higher Education.

Costa, A. L. (Ed.). (1985). *Developing minds: A resource book for teaching thinking.* Washington, DC : Association for Supervision and Curriculum Development.

Cross, K. P. (1971). *Beyond the open door.* San Francisco: Jossey-Bass.

Cross, K. P. (1976). *Accent on learning: Improving instruction and reshaping the curriculum.* San Francisco: Jossey-Bass.

Cross, K. P. (1985). Making students successful: The search for solutions continues. *Change, 17*(6), 48-51.

Cross, K. P. (1986). *Taking teaching seriously.* Address presented at the American Association for Higher Education, Washington, DC: March 1986.

Cronbach, L. J., & Furby, L. (1970). How we should measure "change"– or should we? *Psychological Bulletin, 74*(1), 68-80.

Curtis, M. H. (1980). Commentary. In *Improving Teaching and Institutional Quality. Current Issues in Higher Education, #1.* Washington, DC: American Association for Higher Education.

Davis, R. H., Strand, R., Alexander, L. T., & Hussain, M. N. (1982). The impact of organizational and innovator variables on instructional innovation in higher education. *Journal of Higher Education, 53*(5), 568-586.

Derry, S. J., & Murphy, D. A. (1986). Designing systems that train learning ability: From theory to practice. *Review of Educational Research, 56*(1), 1-39.

Diamond, R. M., Eickmann, P. E., Kelly, E. F., Holloway, R. E., Vickery T. R., & Pascarella, E. T. (1975). *Instructional Development for Individualized Learning in Higher Education.* Englewood Cliffs, NJ: Educational Technology Publications.

Dieker, R. J. (1978). Curriculum development and student needs. *Resources in Education*, ED 166 749.

Dill, D. D., & Friedman, C. P. (1979). An analysis of frameworks for research on innovation and change in higher education. *Review of Educational Research, 49*, 411-435.

Donald, J. G. (1983). Knowledge structures: Methods for exploring course content. *Journal of Higher Education, 54*(1), 31-41.

Donmoyer, R. (1985). Classroom organization and ability grouping. In T. Husen and T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 746-750). New York: Pergamon Press.

Dressel, P. L. (1971). *College and university curriculum* (2nd ed.). Berkeley, CA: McCutchan.

Dressel, P. L. (1976). *Handbook of academic evaluation.* San Francisco: Jossey-Bass.

Dressel, P. L. (1980). *Improving degree programs.* San Francisco: Jossey-Bass.

Dressel, P. L., & Delisle, F. H. (1969). *Undergraduate curriculum trends.* Washington, DC: American Council on Education.

Dressel, P. L., & Marcus, D. (1982). *Teaching and learning in college.* San Francisco: Jossey-Bass.

Egan, K. (1979). *Educational development.* New York: Oxford University Press.

Eggleston, J. (Ed.). (1979). *Teacher decision-making in the classroom.* Boston: Routledge and Kegan Paul.

Eisner, E. W. (1979). *The educational imagination: On the design and evaluation of school programs.* New York: Macmillan.

Eisner, E. W., & Vallance, E. C. (Eds.). (1974). *Conflicting Conceptions of Curriculum.* Berkeley, CA: McCutchan.

El-Khawas, E. (1985). *Campus Trends, 1984.* Higher Education Panel Report No. 65. Washington, DC: American Council on Education.

El-Khawas, E. (1986a). *Campus Trends, 1985.* Higher Education Panel Report No. 71. Washington, DC: American Council on Education.

El-Khawas, E. (1986b). *Campus Trends, 1986.* Higher Education Panel Report No. ?. Washington, DC: American Council on Education.

Ewell, P. (1985). Assessment: What's it all about? *Change, 17*(6), 32-36.

Fantini, M., & Weinstein, G. (1968). *The disadvantaged: Challenge to education.* New York: Harper and Row.

Feisel, L. D., & Schmitz, R. J. (1979). Systematic curriculum analysis. *Engineering Education,* 409-413.

Feldman, K. A. (1970). *Research strategies on college impact.* Iowa City: American College Testing Service.

Fincher, C. (1985). Learning theory and research. In J. C. Smart (Ed.), *Higher education: Handbook of research and theory* (Vol. I, pp. 63-96). New York: Agathon Press.

Fincher, C. (1986). Trends and issues in curricular development. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. II, pp. 275-308). New York: Agathon Press.

Fiol, C. M., & Lyles, M. (1985). Organizational learning. *Academy of Management Review, 10*(4), 803-813.

Ford, G. W., & Pagno, L. (1964). *The structure of knowledge and the curriculum.* Chicago: Rand McNally.

Foshay, A. W. (1969). Curriculum. In R. I. Ebel (Ed.), *Encyclopedia of educational research* (4th ed., pp. 275-280). New York: Macmillan.

Fullan, M., & Pomfret, A. (1977). Research on curriculum and instruction implementation. *Review of Educational Research, 47*(1), 335-397.

Gaff, J. G. (1983). *General education today: A critical analysis of controversial practices and reforms.* San Francisco: Jossey-Bass, 1983.

Gagne, R. M. (1965). *The conditions of learning.* New York: Holt, Rinehart, and Winston.

Gagne, R. M., & Dick, W. (1983). Instructional psychology. *Annual Review of Psychology, 34,* 261-295.

Gamson, Z. (1966). Utilitarian and normative orientations toward education. *Sociology of Education, 39,* 46-73.

Gamson, Z. (1982). *A little light on the subject: Keeping general and liberal education alive.* Paper presented to The National Commission on Excellence in Education.

Gamson, Z., & Associates. (1984). *Liberating education.* San Francisco: Jossey-Bass.

Gardner, D. E. (1977). Five evaluation frameworks: Implications for decision making in higher education. *Journal of Higher Education, 48*(5), 571-593.

Gay, G. (1980). Conceptual models of the curriculum planning process. In A. W. Foshay (Ed.), *Considered action for curriculum improvement* (pp. 120-143). Washington, DC: Association for Supervision and Curriculum Development.

Gioia, D., & Manz, C. C. (1985). Linking cognition and behavior: A script processing interpretation of vicarious learning. *Academy of Management Review, 10*(3), 527-539.

Glaser, R. (1982). Instructional psychology: Past, present and future. *American Psychologist, 37*(3), 171-305.

Goodlad, J. I., & Associates. (1966). School, curriculum, and the individual. Waltham, MA: Blaisdell.

Goodlad, J. I., & Associates. (1979). *Curriculum inquiry: The study of curriculum practice.* New York: McGraw Hill.

Gowin, D. B. (1980). The structure of knowledge. *Educational Theory, 20,* 319-328.

Grant, G., & Riesman, D. (1978). *The perpetual dream: Reform and experiment in the American college.* Chicago: University of Chicago Press.

Grant, G., & Associates (1979). *On competence: A critical analysis of competence-based reforms in higher education.* San Francisco: Jossey-Bass.

Gray, B., & Ariss, S. S. (1985). Politics and strategic change across organizational life cycles. *Academy of Management Review, 10*(4), 696-706.

Griffith, J. (n.d., circa 1985). *Report of Project Match.* Davidson, NC: Davidson College.

Halliburton, D. (1977a). Perspectives on the curriculum. In A. W. Chickering, D. Halliburton, W. H. Bergquist, & J. Lindquist (Eds.), *Developing the college curriculum* (pp. 37-50). Washington, DC: Council for the Advancement of Small Colleges.

Halliburton, D. (1977b). Designing curriculum. In A. W. Chickering, D. Halliburton, W. H. Bergquist, & J. Lindquist (Eds.), *Developing the college curriculum* (pp. 51-74). Washington, DC: Council for the Advancement of Small Colleges.

Halyard, R. A., & Murphy, N. (1978). Using competency based techniques in curriculum development. *Resources in Education,* ED 1154 868.

Handlin, O., & Handlin, M. T. (1970). *The American college and the American culture: Socialization as a function of higher education.* New York: McGraw Hill.

Harris, I. B. (1985). An exploration of the role of theories in communication for guiding practitioners. *Journal of Curriculum and Supervision, 1*(1), 27-55.

Hefferlin, J. L. (1969). *The dynamics of academic reform.* San Francisco: Jossey-Bass.

Hendel, D. D. (1977). Curricular choices and academic success of students enrolled in an elective studies degree program. *Research in Higher Education, 7,* 257-267.

Hewson, P. W., & Posner, G. J. (1984). The use of schema theory in the design of instructional materials: A physics example. *Instructional Science, 13,* 119-139.

Holt, M. J. (1979). *Regenerating the curriculum.* Boston: Routledge and Kegan Paul.

Hook, S., Kurtz, P., & Todorovich, M. (1975). *The philosophy of the curriculum.* Buffalo: Prometheus.

Huebner, D. (1966). Curricular language and classroom meanings. In J. B. MacDonald & R. S. Leeper (Eds.), *Language and meaning*. Washington, DC: Association for Supervision and Curriculum Development.

Huebner, D. (1976). The moribund curriculum field: Its wake and our work. *Curriculum Inquiry, 6*(2), 153-167.

Huenecke, D. (1982). What is curriculum theorizing? What are its implications for practice? *Educational Leadership, 40*(5), 290-294.

Hurd, P. D. (1983). Synthesis processes in curriculum development. In S. A. Ward & L. J. Reed (Eds.), *Knowledge structure and use: Implications for synthesis and interpretation* (pp. 644-670). Philadelphia: Temple University Press.

Hursh, B., Haas, P., & Moore, M. (1983). An interdisciplinary model to implement general education. *Journal of Higher Education, 54*(1), 42-59.

Johnson, B. L. (Ed.). (1982). General education in two-year colleges. *New directions for community colleges, 40*. San Francisco: Jossey-Bass.

Johnson, G. R. (1979). Curriculum development in junior/community colleges: the "state-of-the-art" as viewed by the academic affairs officer. *Resources in Education*, ED 188 710.

Johnson, G. R. (1980). Curriculum development in state supported senior colleges and universities: the "state-of-the-art" as viewed by the academic affairs officer. *Resources in Education*, ED 196 324.

Johnson, M., Jr. (1967). Definitions and models in curriculum theory. *Educational Theory, 17*, 127-140.

Joyce, B., & Weil, M. (1980). *Models of Teaching* (2nd Edition). Englewood Cliffs, NJ: Prentice Hall.

Kaysen, C. (1974). What should undergraduate education be? [Special Issue on American higher education: Toward an uncertain future]. *Daedalus*, 180-185.

Kaysen, C., et al. (1973). *Content and context*. New York: McGraw Hill.

Keeley, S. M., Browne, M. N., & Kreutzer, J. S. (1982). A comparison of freshmen and seniors on general and specific essay tests of critical thinking. *Research in Higher Education, 17*(2), 139-154.

Kelly, A. V. (1972). *The curriculum*. London: Harper and Row.

Kemmis, S., & Hughes, C. (1979). Curriculum evaluation in higher education: Self-reflection in a critical community. *Resources in Education*, ED 202 874.

Kimball, B. A. (1981). *A historical and typological analysis of ideas of liberal education in America*. Unpublished doctoral dissertation, Harvard University, Cambridge, MA.

King, A. R., & Brownell, J. A. (1966). *The curriculum and the disciplines of knowledge: A theory of curriculum practice*. New York: John Wiley.

Knefelkamp, L. (1974). *Developmental instruction: Fostering intellectual and personal growth*. Unpublished doctoral dissertation. University of Minnesota.

Kuh, G. D. (1981). *Indices of quality in the undergraduate experience*. AAHE/ERIC Research Report No. 4. Washington, DC: American Association for Higher Education.

Leithwood, K. A. (1982). *Studies of curriculum decision making*. Toronto: OISE Press.

Leithwood, K. A. (1983). Graduate curriculum studies with a focus on curriculum processes. *Curriculum Inquiry, 13*(1), 65-83.

Leithwood, K. A. (1985). Curriculum diffusion. In T. Husen & T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 1181-1183). New York: Pergamon Press.

Levine, A. (1978). *Handbook on undergraduate curriculum*. San Francisco: Jossey-Bass.

Levine, A. (1982). A report card on the undergraduate curriculum. *AAHE Bulletin, 34*, 7.

Levine, A., & Weingart, J. (1973). *Reform of undergraduate eduction.* San Francisco: Jossey-Bass.

Lindquist, J. (1974). Political linkage: The academic-innovation process. *Journal of Higher Education, 45*(5), 323-343.

Lindquist, J. (1977). In A.W. Chickering, D. Halliburton, W. H. Bergquist, & J. Lindquist (Eds.), *Developing the college curriculum.* Washington, DC: Council for the Advancement of Small Colleges.

Lindquist, J. (1978). *Strategies for change.* Pacific Soundings Press.

Lynch, P. P., & Waters, M. M. (1980). Course orientations of staff and students: A procedure for curriculum evaluation. *Higher Education, 9*, 409-418.

MacDonald, J. B. (1981). Curriculum, consciousness, and social change. *The Journal of Curriculum Theorizing, 3*, 132-154.

Marsh, H. W., & Hocevar, D. (1984). The factorial invariance of student evaluations of college teaching. *American Educational Research Journal, 21*(2), 341-366.

Martin, W. B. (Ed.). (1981). New perspectives on teaching and learning. *New directions on teaching and learning, 7.* San Francisco: Jossey-Bass.

Martin, W. B. (1982). *College of character.* San Francisco: Jossey-Bass.

Marton, F., & Svensson, L. (1979). Conceptions of research in student learning. *Higher Education, 8*, 471-486.

Mayhew, L. B., & Ford, P. J. (1971). *Changing the curriculum.* San Francisco: Jossey-Bass.

McGrath, E. (1976). *General education and the plight of modern man.* Indianapolis, IN: Lilly Endowment.

McKeachie, W. J. (1978). *Teaching tips: A guidebook for the beginning college teacher* (7th ed.). New York: Heath.

McKeachie, W. J., Lin, Y., & Smith, D. A. F. (1986). *Teaching and learning in the college classroom: A review of the research literature.* Ann Arbor, MI: NCRIPTAL.

McNeil, L. M. (1977). Bibliographical essay. In A. A. Bellack & H. M. Kliebard (Eds.), *Curriculum and evaluation* (pp. 627-647). Berkeley, CA: McCutchan.

Meiland, J. W. (1985). *Remarks to the physics department on college curriculum and collegiate goals.* Unpublished manuscript, University of Michigan.

Mentkowkski, M., & Doherty, A. (February 1984). Abilities that last a lifetime: Outcomes of the Alverno experience. *AAHE Bulletin, 36*(6), 5-6, 11-14.

Meyerson, M. (1973). Civilizing education: uniting liberal and professional learning. [Special issue on American higher education: Toward an uncertain future]. *Daedalus*, 173-179.

Mingle, J. R. (1985). *Measuring the achievement of undergraduates: State and national developments.* Denver: State Higher Education Executive Officers.

Nichols, J., & Gamson, Z. (1984). Modifying course content to encourage critical awareness. In Z. Gamson and Associates, *Liberating education*, (pp. 113-129). San Francisco: Jossey-Bass.

NIE Study Group on the Conditions of Excellence in American Higher Education. (1984). *Involvement in learning: Realizing the potential of American higher education.* Washington, DC: National Institute of Education.

NIE Study Group on the Conditions of Excellence in American Higher Education. (n.d.). *Contexts for learning: The major sectors of American higher education.* Washington, DC: National Institute of Education and American Association for Higher Education.

Nordvall, R. C. (1982). *The Process of Change in Higher Education Institutions.* AAHE/ERIC Research Report No. 7. Washington: American Association for Higher Education.

Northeast Missouri State University. (1984). *In pursuit of degrees with integrity: A value-added approach to undergraduate assessment.* Washington, DC: American Association of State Colleges and Universities.

Novak, J. D. (1977). *A theory of education.* Ithaca, NY: Cornell University Press.

Novak, J. D. (1985). Metalearning and metaknowledge strategies to help students learn how to learn. In L. H. T. West & A. L. Pines (Eds.), *Cognitive structure and conceptual change* (pp. 1-7). New York: Academic Press.

Novak, J. D. & Gowin, D. B. (1984). *Learning how to learn.* Cambridge, MA: Cambridge University Press.

Pace, C. R. (1979). *Measuring outcomes of college.* San Francisco: Jossey-Bass.

Pace, C. R. (1984). *Measuring the quality of college student experiences.* Los Angeles: Higher Education Research Institute.

Pascarella, E. T. (1980). Student-faculty informal contact and college outcomes. *Review of Educational Research, 50*(4), 545-595.

Pascarella, E. T. (1985a). College environmental influences on learning and cognitive development: A critical review and synthesis. In J. C. Smart (Ed.), *Higher education: Handbook of research and theory* (Vol. 1, pp. 1-62). New York: Agathon Press.

Pascarella, E. T. (1985b). Students' affective development within the college environment. *Journal of Higher Education, 56*(6), 640-663.

Pascarella, E. T., & Terezini, P.T. (1979). Interaction effects in Spady's and Tinto's conceptual models of college dropout. *Sociology of Education, 52,* 197-210.

Perry, W. G., Jr. (1970). *Forms of intellectual and ethical development in the college years: A scheme.* New York: Holt, Rinehart and Winston.

Phenix, P. H. (1964a). *Realms of meaning: A philosophy of the curriculum for general education.* New York: McGraw Hill.

Phenix, P. H. (1964b). The archetectonics of knowledge. In S. Elam (Ed.), *Education and the structure of knowledge* (pp. 44-74). Chicago: Rand McNally.

Pinar, W. F. (Ed.). (1974). *Heightened consciousness, cultural revolution, and curriculum theory.* Berkeley, CA: McCutchan.

Pinar, W. F. (1978). Notes on the curriculum field 1978. *Educational Researcher, 7*(8), 5-12.

Pintrich, P. R., Cross, D. R., Kozma, R. B., & McKeachie, W. J. (1986). Instructional psychology. *Annual Review of Psychology, 37,* 611-651.

Posner, G. J. (1973a). Beauchamp's "Basic components of a curriculum theory"—a rejoinder. *Curriculum Theory Network, 4*(1), 56-60.

Posner, G. J. (1973b). The use of construct validation procedures in curriculum research. *Curriculum Theory Network, 11,* 34-46.

Posner, G. J. (1974). The extensiveness of curriculum structure: a conceptual scheme. *Review of Educational Research, 44*(4), 401-407.

Posner, G. J. (1978). Tools for curriculum research and development: Potential contributions from cognitive science. *Curriculum Inquiry, 8*(4), 311-340.

Posner, G. J. (1980, October). *New developments in curricular research: It's the thought that counts.* Paper presented to the Northeastern Educational Research Association, Ellenville, NY.

Posner, G. J. (1981, April). *Promising directions in curriculum knowledge: A cognitive psychology perspective.* Paper presented at the American Educational Research Association, Los Angeles.

Posner, G. J. (1985). Curriculum knowledge. In T. Husen, & T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 1223-1227). New York: Pergamon Press.

Posner, G. J., & Gertzog, W. A. (1982). The clinical interview and the measurement of conceptual change. *Science Education, 66*(2), 195-209.

Posner, G. J., & Rudnitsky, A. C. (1982). *Course design: A guide to curriculum development for teachers,* (2nd ed.). New York: Longman.

Posner, G. J., & Strike, K. A. (1976). A categorization scheme for principles of sequencing content. *Review of Educational Research, 46*(4), 665-689.

Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education, 66*(2), 211-227.

Powell, J. P., & Shanker, V. S. (1982). The course planning and monitoring activities of a university teacher. *Higher Education*, 289-301.

Reid, W. A. (1979). Schools, teachers, and curriculum change: The moral dimension of theory building. *Educational Theory, 29*, 325-326.

Reichers, A. E. (1985). Organizational commitment. *Academy of Management Review, 10*(3), 465-476.

Reigeluth, C. M., Merrill, M. D., & Bunderson, C. V. (1978). The structure of subject matter content and its instructional design implications. *Instructional Science, 7*, 107-126.

Resnick, L. B. (1981). Instructional psychology. *Annual Review of Psychology, 32*, 659-704.

Rhodes, G. L., & Young, D. B. (1981). Making curriculum work. *Educational Leadership*, 627-629.

Richardson, R. C., Jr., Fisk, E. C., & Okun, M. A. (1983). *Literacy in the open-access college*. San Francisco: Jossey-Bass.

Riesman, D., Gusfield, J., & Gamson, Z. (1971). *Academic values and mass education*. New York: Doubleday/Anchor.

Rock, D. A., Centra, J. A., & Linn, R. L. (1969). *The identification and evaluation of college effects on students*. Princeton: Educational Testing Service.

Rothwell, W. J. (1983-84). Curriculum theory reconsidered: Strategic planning and organizational theory. *Journal of Educational Technology Systems, 12*(4), 327-336.

Rudolph, F. (1977). *Curriculum: A history of the American undergraduate course of study since 1636*. San Francisco: Jossey-Bass.

Rudolph, F. (1968). *The American college and university*. New York: Knopf.

Schaffarzick, J., and Hampson, D. H. (1975). *Strategies for curriculum development*. Berkeley, CA: McCutchan.

Schaffarzick, J., & Sykes, G. (Eds.). (1979). *Value conflicts and curriculum issues: Lessons from research and experience*. Berkeley, CA: McCutchan.

Scheffler, I. (1973). *Reason and teaching*. Indianapolis: Bobbs-Merrill.

Schubert, W. H. (1986). *Curriculum: Perspective, paradigm, and possibility*. New York: Macmillan.

Schubert, W. H., & Weible, D. M. (1979). Curriculum development at the university level: A case study of curriculum development grants at the University of Illinois at Chicago Circle with implications for selected issues in curriculum. *Resources in Education*, ED 172 640.

Schwab, J. J. (1964). The structure of the disciplines: Meanings and significances. In G. W. Ford, & L. Pugno (Eds.), *The structure of knowledge and the curriculum* (pp. 1-30). Chicago: Rand McNally.

Schwab, J. J. (1969). The practical: A language for curriculum. *School Review, 78*, 1-23.

Schwab, J. J. (1973). The practical 3: Translation into curriculum. *School Review, 81* (4), 501-522.

Shaw, K. E. (1975). Negotiating curriculum change in a college curriculum. In W. A. Reid & D. Walker (Eds.), *Case studies in curriculum change*. London: Routledge and Kegan Paul.

Sherman, T M. (1985). Learning improvement programs: A review of controllable influences. *Journal of Higher Education, 56*(1), 85-100.

Short, E. C. (1983). The forms and use of alternative curriculum development strategies. *Curriculum Inquiry, 13*(1), 43-64.

Shulman, C. H. (1979). Revamping core curricula. *Research Currents*. Washington, DC: ERIC Clearinghouse on Higher Education.

Shulman, L. S. (1970). Psychology and mathematics education. In E. G. Begle (Ed.), *Mathematics education: Sixty-ninth yearbook of the national society for the study of education* (pp. 23-74). Chicago: University of Chicago Press.

Slotnik, H. B., Kerbeshian, L. A., & Heller, P. S. (1985). The implicit clinical curriculum. *American Educational Research Journal, 22*(3), 389-402.

Smart, J. C., & McLaughlin, G. W. (1985). *Baccalaureate recipients: Variations in academic ability, personal values and early career satisfaction*. Paper presented at Association for Institutional Research Forum, Portland, OR.

Smith, B. O., Stanley, W. O., & Shores, J. H. (1957). *Fundamentals of curriculum development* (rev. ed.). New York: Harcourt, Brace and World.

Smith, R. M. (1982). *Learning how to learn*. New York: The Adult Education Company.

Snow, C. P. (1959). *The two cultures and the scientific revolution*. Cambridge, England: Cambridge University Press.

Southern Regional Education Board. (1985). *Access to quality undergraduate education*. Atlanta: Southern Regional Education Board.

Spear, K. I. (Ed.). (1984). Rejuvenating introductory courses. *New directions for teaching and learning, 20*, San Francisco: Jossey-Bass.

Stark, J. S. (1985, March). *The capricious curriculum*. Presidential address at the Association for the Study of Higher Education, Chicago.

Stark, J. S. (1986). A definitional essay on coherence and integrity in the curriculum. *Research in Higher Education* (forthcoming).

Stark, J. S., & Associates. (1986). *Loci of learning: An analysis of educational activities in ten professional fields*. Ann Arbor, MI: University of Michigan (in progress).

Stark, J. S. & Lowther, M. A. (1985). *Curricular integration, student educational goals and educational outcomes*. Ann Arbor, MI: University of Michigan. (Background paper prepared for NIE proposal.)

Stark, J. S., & Lowther, M. A. (1986, April). *Liberal outcomes of professional study*. Ann Arbor, MI: University of Michigan. Paper presented at the American Educational Research Association, San Francisco: (Under revision for publication).

Stark, J. S., Lowther, M. A., & Hagerty, B. M. K. (1986, February). *Faculty priorities for student competence in ten fields of professional study*. Paper presented at the Association for the Study of Higher Education, San Antonio.

Stark, J. S., & Morstain, B. (1978). Educational orientations of faculty in liberal arts colleges: An analysis of disciplinary differences. *Journal of Higher Education, 49*(5), 420-437.

Stephenson, B. W., & Hunt, C. (1977). Intellectual and ethical development: A dualistic curriculum intervention for college students. *The Counseling Psychologist, 6*(4), 39-42.

Stonewater, J. K., & Stonewater, B. B. (1984). Teaching problem-solving: Implications from cognitive development research. *AAHE/ERIC Higher Education Research Currents, AAHE Bulletin*, 7-10.

Stratmeyer, F. B., Forkner, H. L., McKim, M. G., & Passow, H. H. (1957). *Developing a curriculum for modern living*. New York: Bureau of Publications, Teachers College, Columbia University.

Strike, K. A., & Posner, G. J. (1976). Epistemological perspectives on conceptions of curriculum organization and learning. In L. S. Shulman (Ed.), *Review of research in education* (pp. 106-141). Itasca, IL: F.E. Peacock.

Strike, K. A., & Posner, G. J. (1983). Types of synthesis and their criteria. In S. A. Ward & L. J. Reed (Eds.), *Knowledge structure and use: Implications for synthesis and interpretation.* Philadelphia: Temple University Press.

Strom, B., Hocevar, D., Zimmer, J., & Michael, W. B. (1982). The course structure inventory: Discriminant and construct validity. *Educational and Psychological Measurement, 42*, 1125-1133.

Taba, H. (1962). *Curriculum development: Theory and practice.* New York: Harcourt, Brace and World.

Tanner, D., & Tanner, C. N. (1980). *Curriculum development: Theory into practice.* New York: Macmillan.

Teichler, U. (1985). Higher education: Curriculum. In T. Husen, & T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 2196-2208). New York: Pergamon Press.

Tennyson, R. D., & Cocchiarella, M. J. (1986). An empirically based instructional design theory for teaching concepts. *Review of Educational Research, 56*(1), 40-71.

Thelin, J. R. (1982). *Higher education and its useful past.* Cambridge, MA: Schenkman.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*, 89-125.

Toombs, W. (1977-78). The application of design-based curriculum analysis to general education. *Higher Education Review, 1*, 18-29.

Trinkhaus, J. W., & Booke, A. L. (1980). The curriculum change process: Participants, strategies and tactics. *Research in Higher Education, 13*(4), 307-319.

Turnbull, W. W. (1985). Are they learning anything in college? *Change, 17*(6), 23-26.

Tyler, R. W. (1950). *Basic principles of curriculum and instruction.* Chicago: University of Chicago Press.

Vars, G. F. (1982). Designs for general education: Alternative approaches to curriculum integration. *Journal of Higher Education, 53*, 216-226.

Vallance, E. (1985). Ways of knowing and curricular conceptions: Implications for program planning. In E. Eisner (Ed.), *Learning and teaching the ways of knowing. Eighty-fourth Yearbook of the National Society for the Study of Education* (pp. 199-217). Chicago: University of Chicago Press.

Vertinsky, P. (1979). The use of regression to model expressed curriculum content preferences: A measurement methodology and example. *Research Quarterly, 50*(1), 104-113.

Veysey, L. R. (1965). *The emergence of the American university.* Chicago: University of Chicago Press.

Veysey, L. R. (1973). Stability and experiment in the American undergraduate curriculum. In C. Kaysen (Ed.), *Content and context: Essays on college education* (pp. 1-63). New York: McGraw-Hill.

Walker, D. F. (1971). A naturalistic model for curriculum development. *School Review, 80*(1), 51-67.

Walker, D. F. (1975). The curriculum field in formation: A review of the twenty-sixth yearbook of the NSSE. *Curriculum Theory Network, 4*, 4.

Walker, D. F. (1980). A barnstorming tour of writing on curriculum. In A. W. Foshay, (Ed.), *Considered action for curriculum improvement* (pp. 71-81). Alexandria, VA: Association for Supervision and Curriculum Development.

Walker, D. F., & Schaffarzick, J. (1974). Comparing curricula. *Review of Educational Research, 44*(1), 83-111.

Ward, S. A., & Reed, L. J. (Eds.). (1983). *Knowledge structure and use: Implications for synthesis and interpretation.* Philadelphia: Temple University Press.

Weathersby, R. P., & Tarule, J. M. (1980). *Adult development: Implications for higher education.* ASHE/ERIC Higher Education Report No. 3.

Weiss, C. H. (Ed.). (1977). *Using social research in public policy making.* Lexington, MA: Lexington Books.

Welch, W. W., & Walberg, H. J. (1972). A national experiment in curriculum evaluation. *American Educational Research Journal, 9*(3), 373-383.

West, L. H. T., Fensham, P. J., & Garrard, J. E. (1985). Describing the cognitive structures of learners following instruction in chemistry. In L. H. T. West & A. L. Pines (Eds.), *Cognitive structure and conceptual change* (pp. 1-7). New York: Academic Press.

West, L. H. T., & Pines, A. L. (1985). Introduction. In L. H. T. West, & A. L. Pines (Eds.), *Cognitive structure and conceptual change* (pp. 1-7). New York: Academic Press.

White, R. T., & Tisher, R. P. (1986). Research on natural sciences. In M. C. Wittrock (Ed.), *Handbook of research on teaching,* (3rd ed., pp. 874-905). New York: Macmillan.

Widick, C. C., Knefelkamp, L. L., & Parker, C. A. (1975). The counselor as a developmental instructor. *Counselor Education and Supervision, 14,* 286-296.

Widick, C. C., & Simpson, D. (1978). Development concepts in college instruction. In C. A. Parker (Ed.), *Encouraging development in college students.* Minneapolis: University of Minnesota Press.

Williams, W. C. (1985). Effective teaching. *Journal of Higher Education, 56*(3), 320-337.

Willingham, W. (1985). *Success in college: The role of personal qualities and academic ability.* New York: College Entrance Examination Board.

Wilson, R., Gaff, J., Dienst, E., Wood, L. & Bavry, J. (1975). *College professors and their impact on students.* New York: John Wiley and Sons.

Winne, P. H. (1985). Cognitive processing in the classroom. In T. Husen & T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (pp. 795-808). New York: Pergamon Press.

Winter, D. G., McClelland, D. C., & Stewart, A. J. (1982). *A new case for the liberal arts.* San Francisco: Jossey-Bass.

Wittrock, M. C. (1978). The cognitive movement in instruction. *Educational Psychologist, 13,* 15-30.

Wood, L., & Davis, B. G. (1978). *Designing and evaluating higher education curricula.* Washington, DC: American Association for Higher Education. AAHE/ERIC Research Report 8.

Wolfle, L. M. (1980). The enduring effects of education on verbal skills. *Sociology of Education, 53,* 104-114.

Yinger, R. J. (1979). Routine in teacher planning. *Theory into Practice, 18,* 163-169.

Zais, R. S. (1976). *Curriculum: Principles and foundations.* New York: Crowell.

NCRIPTAL

NATIONAL CENTER FOR
RESEARCH TO IMPROVE
POSTSECONDARY
TEACHING and LEARNING